Band 49

Schriften zur Immobilienökonomie
Hrsg.: Prof. Dr. Karl-Werner Schulte
Prof. Dr. Stephan Bone-Winkel

Tobias Pfeffer

Performance of REITs

A Sector- and Company-based Analysis of Links and Time Lags between Real Estate Market Cycles, Earnings, and Pricing of REITs

IRE|BS
International Real Estate Business School
Universität Regensburg

Rudolf Müller

Tobias Pfeffer

Performance of REITs

A Sector- and Company-based Analysis of Links and Time Lags between Real Estate Market Cycles, Earnings, and Pricing of REITs

Prof. Dr. Stephan Bone-Winkel
Prof. Dr. Wolfgang Schäfers
Prof. Glenn R. Mueller Ph.D.

Bibliografische Information der Deutschen Nationalbibliothek
Die Deutsche Nationalbibliothek verzeichnet diese Publikation in der Deutschen Nationalbibliografie; detaillierte bibliografische Daten sind im Internet über http://dnb.d-nb.de abrufbar.

ISBN 978-3-89984-189-3

Umschlaggestaltung: Rainer Geyer, Köln
Druck: SDK Systemdruck Köln GmbH, Köln

Printed in Germany

Das vorliegende Buch wurde auf umweltfreundlichem Papier aus chlorfrei gebleichtem Zellstoff gedruckt.

For my Family

Preface

The cyclical nature of real estate markets poses challenges for both real estate professionals and academia. In light of the recent financial turmoil, the question of to what extent the stock market reflects real estate fundamentals has increased in importance. To address this question, Tobias Pfeffer's dissertation analyzes the link between real estate market cycles and REITs' performance over the period from 1995 to 2006. Because of the complex interplay between real estate and financial cycles and the large amount of detailed data necessary to derive any meaningful results, the dissertation is the first of its kind in terms of the depth and breadth of analysis of the performance of REIT sectors and companies based on their market performance.

Because of the lack of long-term data for REITs in Germany and Europe, the analysis focuses on the largest and most developed REIT market in the United States. In this way, the empirical analysis integrates data from Property & Portfolio Research, SNL Real Estate and the Thomson Datastream for 49 local markets in the U.S. (including the 48 largest metropolitan statistical areas), five sectors (Office, Industrial, Retail, Apartment and Hotel), 131 REIT companies (75% of the market capitalization of Equity REITs), and more than 30,000 individual properties owned by REITs by different market indicators such as occupancy and rent changes over 48 quarters from 1995:Q1 to 2006:Q4.

In his dissertation at the University of Regensburg, Tobias Pfeffer shows and quantifies different time lags between changes in rent and occupancy on one hand, and changes in REIT earnings on the other hand, for each REIT property type sector. For example, the strongest link between an occupancy change in the underlying markets of Office REITs and their earnings occurs after six quarters. Contrarily, Hotel and Retail REITs typically have extremely short (one quarter) or no (zero quarters) time lags. At the same time, the results suggest that the stock market often does not reflect the earnings development of REITs. Although real estate market cycles drive REITs' earnings component, their pricing often is determined by other factors such as investor sentiment. Although the pricing of REITs by real estate fundamentals is often ”irrational” in the short to mid-term, the pricing of REITs by earnings multiples seems to be rational in the long term.

Another important research question the dissertation addresses is whether REIT managers could beat the overall market in terms of higher occupancy levels and rent growth. In this regard, outperformance can arise only from superior timing and selection abilities by overweighting outperforming markets (and vice versa for underperformance) over the 12-year study period. Although REITs' market performance follows the overall market cycle for the corresponding property types, the majority of REIT managers outperformed the market. Considering the large number of REIT companies and properties the results are based on, the analysis shows that the specialization of REITS on property types and markets over time was reflected in superior “market cycle performance.” These findings accentuate the need for a paradigm shift, even for institutional investors in Germany, who

traditionally have relied on a generic and, at the same time, global-oriented real estate investment approach.

Besides his research at the University of Regensburg's IREBS (Institut für Immobilienwirtschaft), the author spent half a year as a visiting researcher at the University of Denver with Prof. Glenn R. Mueller, Ph.D.; and successfully participated in different international research conferences. Prof. Mueller, who is also a visiting professor at the University of Regensburg, has contributed greatly to this thesis' success with his continuous academic guidance and involvement.

Its empirical analysis' depth and breadth make Tobias Pfeffer's dissertation a milestone in research of property cycles and REIT performance. The analytical results create room for further research in this area and contain various suggestions for interested practitioners, particularly for international investors' investment policy and portfolio management.

Regensburg, Denver, December 2008

Prof. Dr. Stephan Bone-Winkel
Prof. Dr. Wolfgang Schäfers
Prof. Dr. Karl-Werner Schulte
Prof. Glenn R. Mueller, Ph.D.

Foreword

At the beginning of my research in 2005, REITs did not exist in Germany. Extensive research about listed real estate in Germany or Europe was not available. Therefore, the work at the ebs real estate department (later IRE|BS) gave me the opportunity to participate in interesting projects on various aspects of listed real estate.

Similar to business cycles, real estate markets are subject to cyclic movements that reflect the activities in different space markets. Research provides evidence that "physical" and "financial" real estate cycles affect property types and markets. While research has investigated the importance of market cycles for different property types, the question to what extent the "performance" of real estate investment trusts reflects the return characteristics of the underlying real estate assets in conjunction with physical and financial market cycles and space market fundamentals remains unresolved.

Thus, the dissertation analyzes the development and experience of the largest and most developed REIT market in the United States and aims to contribute to a better management of and investment in REITs. In this way, a research framework is established to analyze the importance of space market fundamentals for REITs by combining the physical market cycle (for different property types and markets) with the underlying assets of REIT sectors and individual companies. In the second step, the dissertation analyzes the relationship between the earnings and pricing of REITs and the exposure to space market cycles and fundamentals as described beforehand. Moreover, the study will analyze the implications for REITs in Europe, especially Germany.

First, I would like to thank my doctoral thesis supervisor and academic father, Prof. Dr. Stephan Bone-Winkel, who was not only my advisor but also a great role model, academically and professionally, and supported me during my time at the university. His professionalism and hands-on experience were invaluable for the success of my thesis. His trust and academic freedom during the time of my dissertation – at the ebs, Oestrich-Winkel as well as at the IRE|BS at the University of Regensburg – were essential for the accomplishment of my thesis. Without his support, this research piece would never have got to the point it has.

Second, my thanks go to Prof. Dr. Schäfers for being my co-corrector (second reviewer). His comprehensive knowledge and vast experience in the area of listed real estate and real estate investment banking were of great help to me. His constructive criticism during the time of the dissertation, from the first draft to the final version of it, was of great importance to me.

Third, I want to thank Prof. Glenn Mueller, for giving me the chance to learn from his academic excellence and benefit from his comprehensive knowledge of real estate capital markets. He is also one of the most reputable REIT researchers. His support in form of academic guidance and ongoing constructive feedback, the opportunity to work with him at the Burns School of Real Estate at the University of Denver as a visiting

scholar as well as his broad network in the REIT industry have opened doors for me that gave me the chance to put the dissertation at a whole different level.

Also, I would like to express my gratitude to Prof. Dr. Karl-Werner Schulte, who was my co-corrector at the ebs Department of Real Estate and could not fulfill this role at the IRE|BS according to formal guidelines of the University of Regensburg. His network and commitment created opportunities and opened doors for me. I would also like to thank Prof. Karantonis, who gave me the chance to participate in the real estate master program at the Technical University of Sydney, where I also had the chance to work for an Australian REIT (LPT), which triggered my first interest in the topic. In addition, I would like to thank Prof. Dr. Mark Levine and Prof. Dr. Michael Crean from the University of Denver for the opportunity to spend half a year at the Burns School of Real Estate. In addition, I would like to thank Keven Lindemann, SNL Real Estate, for his technical support and expertise as well as the opportunity to use the SNL database.

Although the dissertation period has been a great time, it has been challenging and tough from time to time. The ongoing support from my colleagues made it fun and possible. For their continuous advice and assistance, I would like to thank in particular Sascha Becker, Philipp Feldmann, Nicolai Gerstner, Helmut Schleich, Martin Becker, Patrick Schlump, Dominique Pfrang, Julia Gentgen, Jenny Arens, Friederike Sperl, Manuel Breidenbach, Nicolas Kohl, Melanie Sturm, and all my other colleagues, but in particular Alexander Orthmann. In addition, my special thanks go to Georg and Ikarus Haber, who helped me the best way they could in Regensburg. Furthermore, I would like to thank a group of friends, namely: Dominik, Jette, Oliver, Stephan, Melanie, Christian, Isaac, Alec, Robin, Pascalle and Alexander. Furthermore, my time at the ebs Department of Real Estate with its soul and center Simone Schlager, Brigitte Gruss and Gudrun Würdemann, and the great teamwork was important for me. I would like to thank all of my companions from the department who have accompanied me during my time as a research assistant and doctoral candidate.

Altogether, the dissertation time has been invaluable to me. Also, it has been an exciting time with immense changes not only caused by the move from the ebs Department of Real Estate to the International Real Estate Business School at the University of Regensburg. In retrospect, the dissertation project has brought me forward and was a great period of time with ups and downs.

Most important, my thankfulness goes to my loved ones: my brothers Nils and Benjamin, without whom I would never have developed the strong will to write this thesis, and Eva, for all her patience and backing during this time. Last but not least, to Magdalena for who I am at a loss for words. Also my parents, who made every effort to support me in all my decisions and on all my way. Without their love and ongoing support, I would not be where I am today.

Regensburg, 2008 Tobias Pfeffer

Table of Contents (short)

Table of Contents (long)

List of Abbreviations

ADR	Average Daily Room Rate
AFFO	Adjusted Funds From Operation
AP	Apartment
APT	Arbitrage Pricing Theory
BNP	Brandywine Realty Trust
BXP	Boston Properties REIT
CAD	Cash Available for Distribution
CAM	Common Area Maintenance
CAPM	Capital Asset Pricing Model
CBE	Central Business District
CCF	Cross-correlation Function
CMHC	Canadian Mortgage and Housing Corporation
CRE	Crescent Real Estate Equities Corporation
DEC	Dominant Economic Employment Categories
EBC	Economic Base Category
EDR	Education Realty Trust
EGI	Effective Gross Income
ELS	Equity LifeStyle Properties, Inc.
EOP	Equity Office REIT
EPRA	European Real Estate Association
EPS	Earnings-per-share
EPZ	Employment Performance Zone
EQ	Equity
EREIT	Equity REIT
FAD	Funds Available for Distribution
FASB	Financial Accounting Standard Board
FTSE	Financial Times Stock Exchange Index
GAAP	Generally Accepted Accounting Principles
GLA	Gross Leasable Area
HIG	Highwoods Properties, Inc.
HO	Hotel
HST	Host Hostel Resorts Inc.
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
IJV	International Joint Venture
IN	Industrial

IN-REIT	Industrial REIT
IRS	Internal Revenue Service
LTAO	Long-Term Average Occupancy
LtAv	Long-term Average
MAC	Mack-Cali Realty Corporation
Metro	Metropolitan Statistical Area
MF-REITs	Multifamily REITs
MH-REITs	Manufactured Housing REITs
Micro	Micropolitan Statistical Area
MMT	Modigliani-Miller-Theorem
MSA	U.S. Urban Metropolitan Areas
MULT	FFO Multiple
NAREIT	National Association of Real Estate Investment Trust
NAV	Net Asset Value
NCREIF	National Council of Real Estate Investment Fiduciaries
NPI	NCREIF Property Index
NPV	Net Present Value
OF	Office
OMB	U.S. Office of Management and Budget
OPM	Option Pricing Model
OR-REIT	Other Retail REIT
PCT	Plum Creek Timber
PREI	Prudential Real Estate Investors
PRICE_	Stock Price
PRR	Property & Portfolio Research Inc.
RE	Retail
RECA	Real Estate Capital Analytics
REOC	Real Estate Operating Company
RE-REITs	Retail REITs
RevPAR	Revenue per Available Room
RMA	REIT Modernization Act
RM-REIT	Regional Mall REIT
ROI	Return on Investment
RREM	REIT-Real Estate Model
SC-REIT	Shopping Center REIT
SIC	Standard Industrial Classification
SPG	Simon Properties Group, Inc.
SqFt	Square Foot
TRA	Taxpayers Relief Act
TRS	Taxable REIT Subsidiary

List of Tables

List of Figures

List of Formulas

1 Introduction

1.1 Research Problem and Importance of the Study

"If you're an investor, you're looking on what the asset is going to do, if you're a speculator, you're commonly focusing on what the price of the object is going to do, and that's not our game."

Warren Buffet, 1997 [1]

The overall performance of real estate investment trusts (REITs) has been analyzed extensively by various researchers, for example, SCHÄFERS/KOHL/SCHULTE (2008a), BONE-WINKEL/PFEFFER (2008a); LING/NARANJO (2006); OTT/RIDDIOUGH/HA-CHIN (2005); LIANG (1998).[2] Their research as well as publications by NAREIT (2007) demonstrate that REITs offer attractive returns and provide relatively high dividend yields and moderate long-term capital appreciation.[3] Moreover, the relevance and style of real estate investment trusts and the benefits of their inclusion in mixed-asset portfolios have been investigated by different scholars.[4]

Furthermore, other studies by the researchers CHIANG/MING-LONG (2007); BREIDENBACH/MUELLER/SCHULTE (2006); MUELLER/MUELLER (2003); SEILER/WEBB/MYER (2001); CRAFT (2001); PETKUNAS/MUELLER (1998); SIMONS (1993) have targeted the relationship between securitized and unsecuritized real estate.[5] Nonetheless, evidence showing to what extent REIT returns reflect the space market cycles of the underlying real estate assets has been inconclusive. Although several studies have analyzed the return characteristics of REITs, mostly on an aggregate level, by explaining them with aggregated performance data of stock and bond market factors as

[1] Cf. BUFFET, W. (1997), no page; According to FORBES (2007), no page, Warren Buffet is the second richest man and most successful investor and known for his "value investment" approach based on a "fundamental analysis" of stocks.

[2] Cf. SCHÄFERS/KOHL/SCHULTE (2008a); BONE-WINKEL/PFEFFER (2008a); LING, D./NARANJO, A. (2006); OTT, S.H./RIDDIOUGH, T.J./HA-CHIN, Y. (2005); LIANG, Y. (1998).

[3] Cf. NAREIT (2007c), no page.

[4] Cf. MUELLER, G.R. (2007b); CHIANG, K.C.H./MING-LONG, L. (2007); LEE, S./STEVENSON, S. (2005a); SING, T.F./LING, S.C. (2003); SEILER, M.J./WEBB, J.R./MYER, F.C.N. (2001); LIANG, Y./CHATRATH, A./MCINTOSH, W. (1996); KUHLE, J.L. (1987).

[5] Cf. CHIANG, K.C.H./MING-LONG, L. (2007); BREIDENBACH, M./MUELLER, G.R./SCHULTE, K.-W. (2006); MUELLER, A.G./MUELLER, G.R. (2003); SEILER, M.J./WEBB, J.R./MYER, F.C.N. (2001); CRAFT, T.M. (2001); PETKUNAS, F.J./MUELLER, G.R. (1998); SIMONS, R.A. (1993).

well as unsecuritized real estate, the findings show mixed results.[6] The work of CLAYTON/MACKINNON (2001) as well as the studies conducted by KAISER (2005) and KAISER (1999) suggest that the relationship between REIT returns, real estate, and financial assets is cyclical.[7]

Even though the existence and importance of real estate cycles in general have intrigued practitioners as well as academics – most importantly, the work of PYHRR et al. (2003); MUELLER (2002); WHEATON (1999); KAISER (1997); MUELLER/LAPOSA (1994b)[8] – the link between physical and financial cycles and the performance of securitized real estate has not been analyzed coherently due to the difficulties involved, neither on an aggregate level nor for REIT sectors or companies.[9]

The findings regarding the impact of the financial cycle represented by capital flows on the one hand and space market fundamentals – as reflected in the physical market cycle – on the other hand to explain asset prices (property prices) are often conflicting.[10] At this juncture, different approaches exist to explain, for example, the situation of decreasing cap rates in conjunction with weakening rent and occupancy levels. While one strand of literature assumes that this is a result of forward-looking asset pricing, for example, CORCORAN/IWAI (2003), other scholars argue that interest rates and hence the spread between Treasury bond yields and real estate have to be factored in.[11] The issue to what degree the stock market is able to adequately price REITs by their underlying assets and cycles involved remains open.

Due to the specific regulatory and tax framework, the structure of a real estate investment trust differs from a typical corporation. Since REITs are restricted in their activities and are mandated to have a high dividend payout, the degree of discretion for management is limited similar to free cash flow.[12] These factors − in conjunction with

[6] Cf. HOESLI, M./CAMILO, S.M. (2007), p. 59-60; WAGGLE, D./AGRRAWAL, P. (2006), p. 219; ANDERSON, R., et al. (2005), p. 285.

[7] Cf. KAISER, R.W. (2005), p. 17; CLAYTON, J./MACKINNON, G. (2001), p. 52; KAISER, R.W. (1999), p. 16.

[8] Cf. PYHRR, S.A., et al. (2003); MUELLER, G.R. (2002); WHEATON, W.C. (1999); KAISER, R.W. (1997); MUELLER, G.R./LAPOSA, S.P. (1994b).

[9] Refer to Chapter 2.1, p. 10 for a detailed description of physical and financial market cycles.

[10] Cf. SIVITANIDES, P.S./TORTO, R.G./WHEATON, W.C. (2004); MUELLER, G.R. (1995).

[11] Cf. CORCORAN, P./IWAI, Y. (2003), p. 42; SIVITANIDES, P.S./TORTO, R.G./WHEATON, W.C. (2003), p. 52 ; ADAMS III, A.F./JACKSON, J.D./COOK, J.P. (2001), p. 119 et seq.

[12] Sum of cash flows less taxation, interest, dividends paid to shareholders and minority interest.

the transparency of the underlying property markets of REITs − should underpin the relationship between asset markets and stock performance, as shown for the case of REIT IPOs by HARTZELL/KALLBERG/LIU (2005), and is subject to further research.[13]

With a value of more than $10.1 trillion, representing approximately 20% of investable asset classes in the United States,[14] commercial real estate is an important asset class for investors worldwide. Furthermore, the importance of real estate as an asset class (public and private) in general has increased during the last few years, particularly public real estate.[15] The worldwide success and spread of the REIT concept illustrate the growing importance of listed real estate.[16] Especially, the introduction of REITs in European and Asian countries has fostered the development of a listed real estate segment in these countries. Although the year-to-date returns show that the listed real estate segment has undergone a correction, the overall five-year rolling return series shows the stellar investment performance of European and Asian listed real estate with an average return of 19% and 18%. Even on a global basis, global real estate has outperformed global equities and bonds from a total return perspective, as shown in the table below.

Table 1: FTSE EPRA/NAREIT Global Real Estate Total Return Index

Asset Classes (€)	Mar-08 Return %	YTD Return %	Rolling 5 Yrs Return %	Average Annual Return %
Global Real Estate	-3.8	-12.9	96.1	14.4
Global Equities	-2.2	-12.0	67.6	10.9
Global Bonds	-0.1	3.9	20.7	3.8
Europe Real Estate	-3.1	-1.8	138.5	19.0
N. Amer. Real Estate	1.0	-7.2	65.9	10.7
Asia Real Estate	-8.8	-22.8	128.8	18.0

Source: EPRA (2008a), no page.

Since investment performance is measured by total returns, which have two components (capital appreciation, which is reflected by the stock price change, and income in the form of dividends),[17] it is important to understand to what extent the total return is

[13] Cf. HARTZELL, J.C./KALLBERG, J.G./LIU, C.H. (2005), p. 47-48; Refer to Chapter 2.3, p. 40 for a detailed description of the organizational structure of REITs and their regulatory and tax framework.

[14] Cf. MUELLER, G.R. (2007b), p. 3.

[15] Cf. EPRA (2008b), no page; CHIANG, K.C.H./MING-LONG, L. (2007), p. 7-9; CONNER, P./FALZON, R. (2004), p. 111 et seq.

[16] Cf. EPRA (2008b), no page.

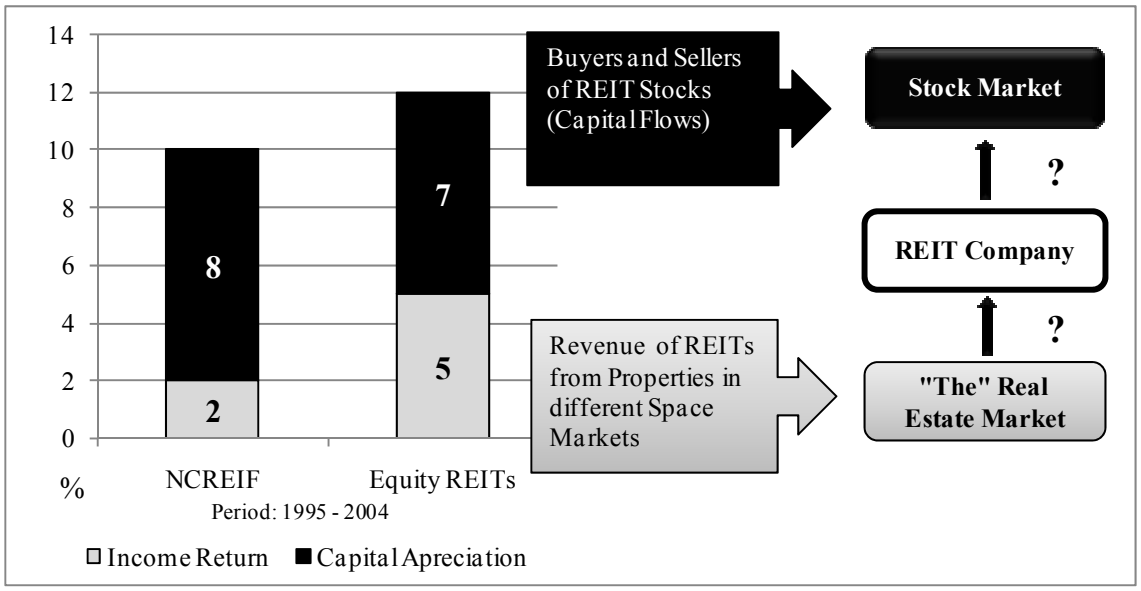
[17] Cf. HENDERSHOTT, P.H./KANE, E.J. (1995), p. 101-103; FINANCIAL-DICTIONARY (2007), no page.

attributable to the performance of the underlying assets (reflected in real estate market cycles) and what part is determined by capital flows ("financial cycle") to public and private real estate asset markets, on the other hand.[18]

From an academic viewpoint, this dissertation project contributes to a better understanding of the complex relationship between REIT returns, the property holdings of REITs, and the implied real estate market cycles. In this way, the dissertation will analyze theoretically and practically the effect of market cycle parameters such as rental growth rates and occupancy levels (the inverse of vacancy) on stock performance, depending on the real estate exposure in the respective markets for different time periods differentiating between REIT sectors and companies.

Due to the complex interplay of real estate and financial cycles and because of the large amount of detailed data necessary to derive any meaningful results, research has not been able to adequately verify the structural relationship between financial market cycles, real estate, and REIT returns yet. Furthermore, time lags between space markets, real estate assets, and stock markets complicate the analysis.

Figure 1: Private versus Public Real Estate Pricing – Return Components



Source: Own illustration based on NAREIT, NCREIF cited after MUELLER (2007a).

As shown in Figure 1, the return of public and private real estate has two components that have different determinants. Also, the pricing of public real estate differs from the

[18] Cf. LIN, C./YUNG, K. (2006); LING, D./NARANJO, A. (2006); HUDSON-WILSON, S., et al. (2005).

pricing of private real estate because the price of public real estate is determined in the stock markets. While the income component of public real estate comes mainly from revenue from properties in different space markets, the reasons for buying and selling REITs stocks is more complex. In addition, the question whether the higher total return of public real estate is due to a better "real estate performance" or based on other factors is inconclusive.

From a practically oriented perspective, this dissertation project will contribute to a better understanding of the importance of physical market cycles for the performance of listed real estate, from a shareholders' point of view as well as from a management standpoint. Furthermore, the analysis will investigate to what degree Real Estate Investment Trust return characteristics represent the return profile of direct real estate.

Moreover, the introduction of REITs in Germany and other European countries will pose the question for investors how and to what extent they should invest in German and other European REITs to gain exposure to real estate. At this juncture, the examination of the REIT market in the United States as the largest and most mature listed real estate market will give an indication as to which groups of investors in real estate this market might be appealing.

Therefore, the dissertation aims to integrate the physical or space market cycle for different markets and property types, on the one hand, with the actual and historical real estate asset holdings of REITs (on a REIT sector and company level) on the other hand to explain the profitability of Real Estate Investment Trusts on a company level and their returns on a stock-market level as will be described in greater detail in the following section.

1.2 Purpose of the Study

In this way, the purpose of the study is to analyze critically the importance of physical market cycles for the performance of REITs on sector and company levels. This is done in a two-tiered analysis. First, by analyzing the underlying assets – the property holdings – that REITs have in different markets over 48 quarters and combining them with the corresponding market cycles. Second, analyzing the link between the "physical market cycle" of a REIT sector or company with performance measures such as Funds

from Operation (FFO) (proxy for profitability), stock price, and FFO multiples (proxy for pricing).

"The aim of the dissertation is to analyze the link and time lags between space market cycles (in different local space markets for different property types), the property exposure of REITs in the respective markets on the one hand with the performance of REITs on a company and stock-market level on the other hand. At this juncture, it is scrutinized whether and to what extent space market fundamentals are able to explain the performance of REIT property sectors as well as individual companies in the Unite States."

At this juncture, the analysis consolidates the most prominent real estate attributes:

- **"Location"** differentiating among 48 local markets (e.g., Atlanta, Austin, Baltimore, Boston, Charlotte, [...] Washington, DC), and one market (USA) (others) that merges the remaining smaller markets,
- **"Property Type"** distinguishing among 1) office, 2) retail, 3) apartment, 4) industrial, and 5) hotel and the
- **"Physical Market Cycle"** investigating the dynamics of 1) demand, 2) supply, 3) absorption, 4) vacancy levels, and 5) rental growth rates
- **over 48 quarters** (1995:Q1 to 2006:Q4) separately for each of the 49 markets and all five property types.[19]

Accordingly, these characteristics are applied to the property holdings of REITs for the sample period 1995:Q1 to 2006:Q4 including datasets on more than 60,000 REIT properties and are then combined with the physical market cycle information for each property type, period, and market.[20]

[19] This results in 11,760 (49*5*48) different "space market cycle" data points only for the rental cycle not differentiating between rent *levels* and rental *growth rates*.

[20] The original data sample contained datasets on more than 60,000 individual properties (>99% of all property holdings of REITs over the study period). Each dataset contains at least the exact size, the REIT that owned the building, MSA, address and period of time during which the building was part of a REITs portfolio. Refer to Chapter 3.3.2, p. 80 for a description.

In this light, the overall objective of the study is to do the following:

- *Describe, classify, define,* and *analyze* market cycles, the underlying assets, and performance of REITs, including their change over time and the relationship between these factors,
- *Forecast* REIT performance by developing a forecast model for Office, Industrial, Retail, Apartment, and Hotel REITs,
- *Explain* why and how market cycles predict REIT performance, and
- *Evaluate* and *discuss critically* investment strategies of REITs in terms of their "market cycle" performance.

At this, the analysis is limited to the five largest U.S. Equity REIT sectors (Apartment, Office, Retail, Industrial, and Hotel) and excludes Mortgage, Hybrid, Finite, Specialty, Diversified, Healthcare, Self-storage, and Canadian REITs.[21] In this way, the empirical analysis is two-tiered, applying a portfolio manager's view analyzing the performance of REIT *sectors* and an analyst's view looking at individual REIT *companies*. At this, the research objective is targeting the following subareas:

1. Fundamental Analysis of REIT property-type sectors,
2. Analysis of Operating Performance and Pricing of REITs,
3. Characteristics and Developments of Space Markets of REITs,
4. Real Estate Investment Strategies of REITs,
5. Space Market Performance and Cycles of REITs,
6. Cross-correlation and Time Lags of Space Market, FFO, and Pricing Factors,
7. Regression Model, including Macroeconomic Control Factors.

1.3 Outline of the Study

The contribution of this study is its detailed theoretical and empirical investigation of the link between REIT performance and real estate and market cycles. Based on the research problem, the purpose of the study and the following hypotheses and research question specify the scope and limitations of the analysis in chapter 1.

[21] These sectors are also referred to as the main "Five Food Groups" of REITs.

Chapter 2 starts with a definition of market cycles that are a main part of the analysis. The precise definition and profound understanding of financial and physical market cycles set the basis for the following analysis. Also, the investment strategy of a REIT and the term diversification are conceptualized. Chapter 2.2 specifies the assumptions and theoretical framework of the analysis as well as the "physical market cycle construct." Having operationalized the research questions, chapter 2.2.2 defines the REIT-Real Estate System that is the basis for the analysis and illustrates the structural relationship between space markets, REIT company, and the stock market. This forms the basis for the hypotheses as represented in chapter 3.1. Subsequently, the REIT sectors, which are the subject of the analysis, are classified and narrowed down because of the sometime vague designation.[22] Thereafter, the relevant aspects of REIT fundamentals that are necessary are explained. The chapter concludes with the main concepts and principles that are an integral part of the investigation and an introduction to capital market theory as the theoretical foundation.

Having set the conceptual and theoretical foundation, chapter 3 starts with the core of the study, the empirical analysis. In the first step, the state of research is scrutinized in the form of a detailed literature review as a starting point of the analysis. Since an extensive amount of research on REITs has been published, a comprehensive review is required to clarify which areas have been discussed already as well as to describe the current state of knowledge regarding the importance of the underlying assets and market cycles for different REIT sectors. Second, the methodology that is applied is explained and substantiated. Finally, the data sources and sample are qualified in detail.

Subsequently, the results of the analysis are then presented in the findings in chapter 4. At this juncture, the structure of the chapter and the sections accordingly follow the different levels and steps of the analysis. To start, chapter 4.1 performs a fundamental analysis of the most important fundamental that are core to the analysis, particularly Funds from Operations, real estate investments of REITs, and the pricing of REITs by useful ratios. This is necessary to understand the change, for example, in terms of real estate investment growth of REITs over the study period, which may differ between

[22] Classifications of REIT sectors can differ for example for Industrial/Office REITs like Duke Realty REIT that could be and is classified as a "Mixed Office/Industrial REITs", "Office REIT" or "Diversified REIT" depending on the institution that classifies the REIT e.g. NAREIT, DATASTREM, REUTERS or SNL Real Estate. In this way, the analysis typically follows the SNL Real Estate classification because it is the most precise by means of the property holdings of REITs.

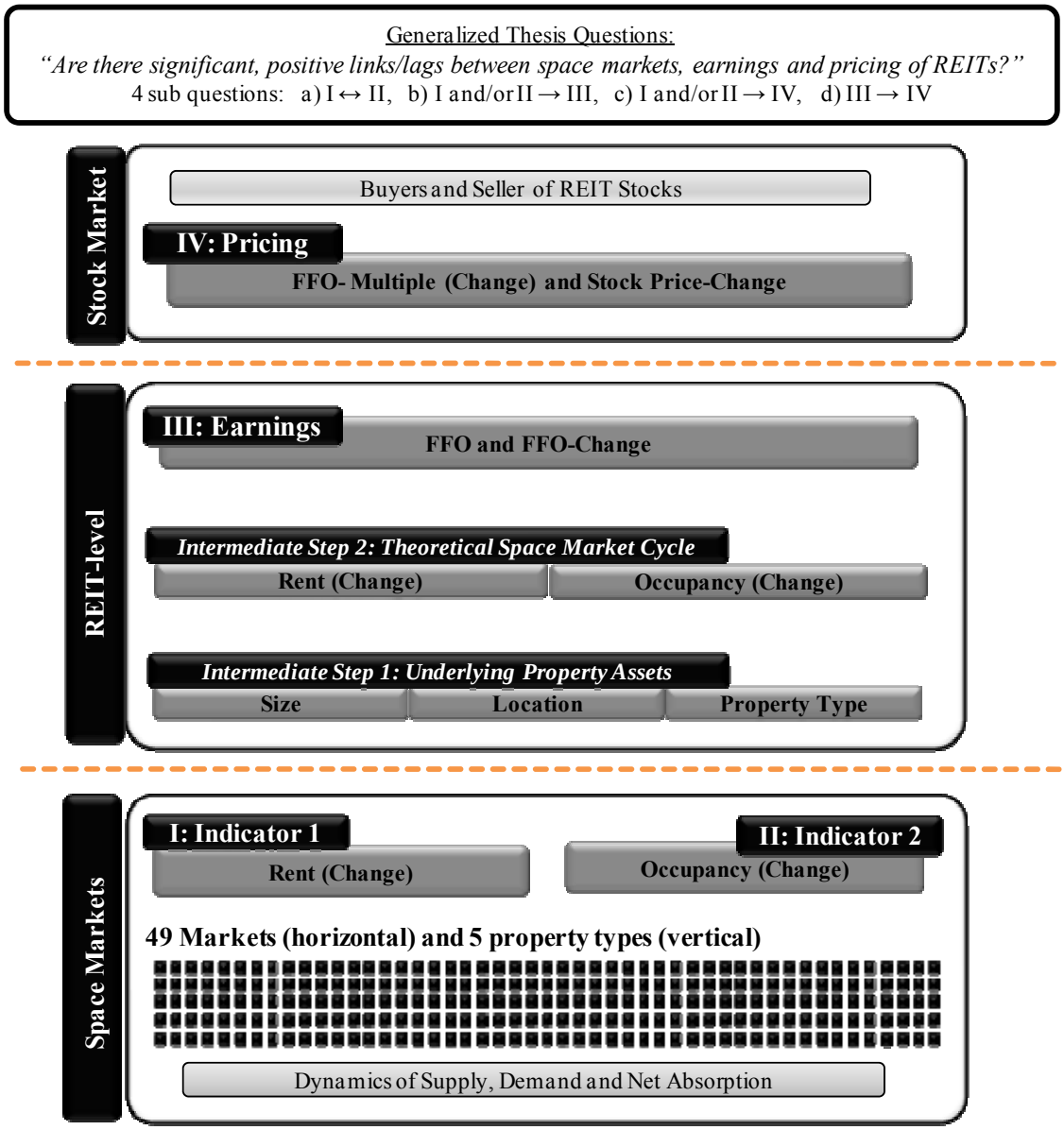
sectors. Also, the most important financial aspects of U.S. REITs are clarified, and sector differences are highlighted. Since the analysis integrates and consolidates three large and distinct areas of interest − a) "Performance of REITs," b) "Underlying Assets of REITs," and c) "Real Estate Market Cycles" – a separate analysis of each of the aforementioned parts is vital. It starts with a description and validation of the sample characteristics and asset holdings, including the various subsamples for REIT sectors and companies. Thereafter, the findings regarding the performance of REITs by means of operating performance (FFO), on the one hand, and stock market performance (FFO multiples and stock price change), on the other hand, are elaborated in chapter 4.2 by different performance measures. Subsequently, chapter 4.3 analyzes the space markets, differentiating among office, industrial, retail, apartment, and hotel, that REITs invest in. After this, the results of the market cycle analysis for REIT sectors and companies are shown in chapter 4.4.

The following sections present the findings of the cross-correlation analysis of market cycle, FFO, and pricing factors. In this way, the findings show the sector-level results first, and the industry examples from each sector are given to highlight the differences between individual companies of one sector. This is an important step because the cross-correlation analysis indicates the direction and strength of the relationship between the different variables and illustrates time lags, for example, between market cycles and performance as well as between different market cycle factors such as occupancy and rent levels. Second, the regression analysis examines the relationship of the dependent variables (performance by various measures) and the specified independent variables (market cycle parameters). The regression analysis helps to model structural relationships between the factors under investigation in the analysis and test the scientific hypothesis of this study about the relationship between variables. Again, several industry examples illustrate the procedures applied and the results for individual REIT companies of all corresponding sectors.

The study is then completed by a discussion of the results in chapter 5. In this way, the discussion comments and puts into perspective the findings of the preceding chapter. At this, the chapter is structured in a first part that evaluates the hypotheses, a second part that summarizes the findings for each REIT property sector, a third part that interprets the findings and their importance for different groups of investors, and a fourth part that denotes the implications for REITs in Europe. Thus, the findings are then summarized

and critically reflected in chapter 6, and future research perspectives are given in chapter 6.3.

Figure 2: Overview of Study



Source: Own calculation.

2 Theoretical Framework and Fundamentals

The following chapter sets the definitional and conceptual basis for the following analysis. At this juncture, the most important terms used in the analysis are defined and described. Also, REIT sectors are classified and specified because of the sometimes ambiguous or misleading application of REIT sector denominations. Moreover, the most important REIT fundamentals that set the foundation for the empirical analysis are explained. Finally, the basic principles of diversification and specialization necessary for the subsumption of the analysis are presented.

2.1 Definitions and Concepts

2.1.1 Physical and Financial Real Estate Market Cycles

Space Market Cycle

The physical market cycle, also referred to as the "space market cycle," is determined by the fundamental factors for real estate. In this way, physical market cycles are always local in nature, and space demand is a function of the number of people who need space to live or work there. Also, the amount of space rented is a function of the demand for space on the one hand and the price of that space on the other hand. Similarly, supply of space is determined by space under construction, existing space, and the future demand of space. Additionally, rent is a function of the current space that is available (vacancy or occupancy levels) and the future expected space available.[23]

Research by SIVITANIDES/TORTO/WHEATON (2004); BENJAMIN/JUD/WINKLER (1998a); BENJAMIN/JUD/WINKLER (1998b) MUELLER (1999); MUELLER (1995); MUELLER/LAPOSA (1994b) has shown that rent and vacancy/occupancy levels are a function of the supply and demand at any point in time. At this juncture, rental and occupancy levels that are highly correlated are the best description of the interplay of supply and demand. Moreover, these scholars' research has proved that physical market cycles are differential for: a) property types and b) metro areas.[24] This implies that there are differences within states and NCREIF regions. For instance, the Denver office

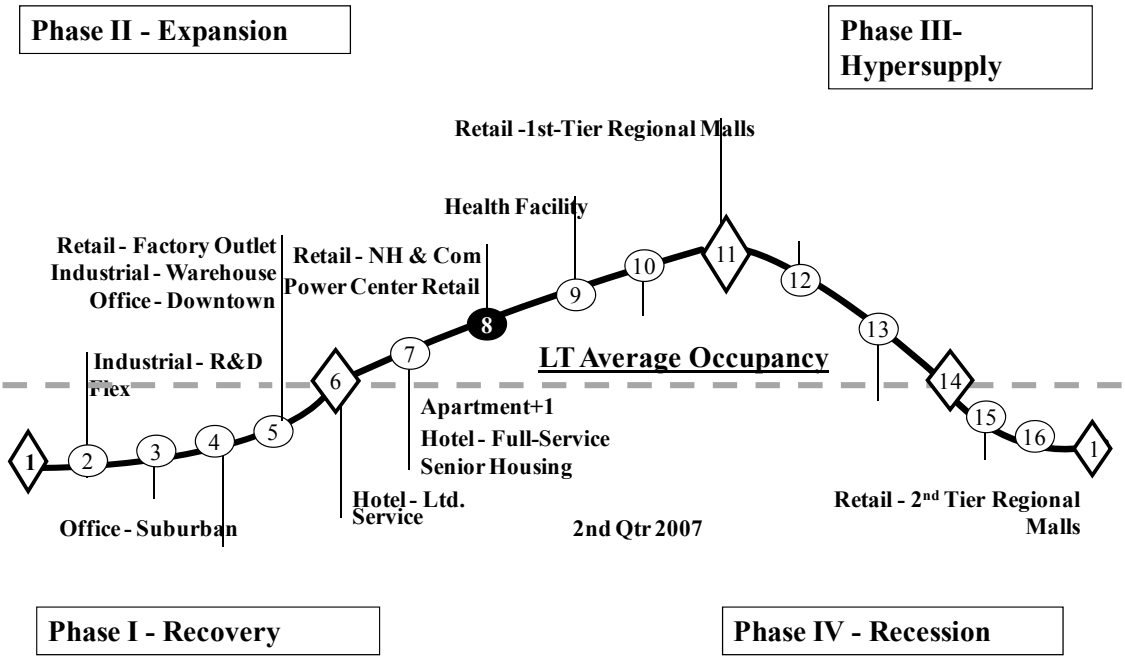
[23] Cf. MUELLER, G.R. (2006), p. 4.

[24] Cf. SIVITANIDES, P.S./ TORTO, R.G./ WHEATON, W.C. (2004), p. 52; MUELLER, G.R. (1999); MUELLER, G.R. (1995); MUELLER, G.R./LAPOSA, S.P. (1994b), p. 42-43.

market cycle may differ significantly from the Denver industrial market cycle, the same as the Denver office market differs significantly from the New York office market. Although markets within a state such as California are affected by similar state and regional factors, space market cycles can still be different.

The differences in market cycle position can best be shown by the market cycle monitor from Dividend Capital Research. Its author Glenn Mueller shows the position of the five major property types for more than 50 markets. Figure 3 shows the average national market cycle position of different property types for the United States (aggregated only). Each number indicates a different position in the property cycles measured by occupancy levels and rental growth rates. At this juncture, the dashed line indicates the long-term average occupancy rate, indicating that markets in positions 7 to 13 have higher occupancy rates than the long-term average.[25]

Figure 3: National Property Type Cycle Locations



Source: DCR (2007), p. 1.

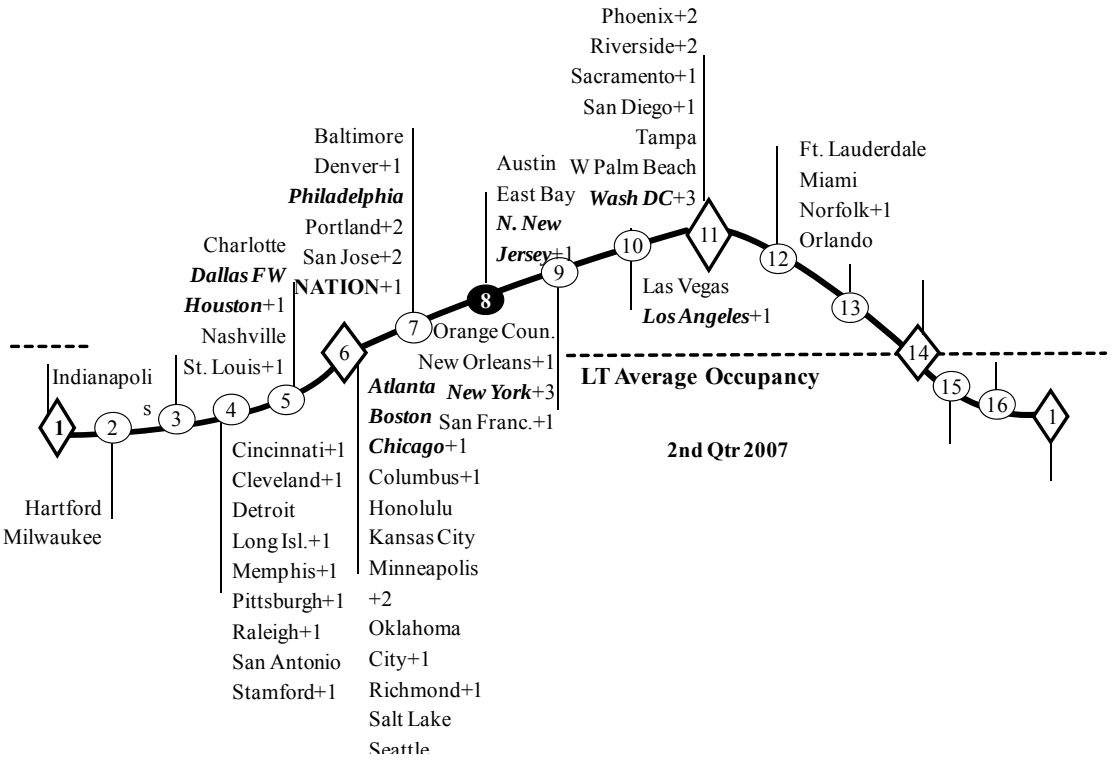
The diagram clearly demonstrates that different property types can be at significantly different positions in the market cycles. It is shown that most property types were in a recovery and expansion phase as of 2007:Q1 characterized by increasing rental growth rates and occupancy levels. Only a few property sectors, "Retail – 1st-Tier Regional

[25] Cf. Chapter: 3.1.1, page 52 for a detailed description of market cycles and the type of diagram used here to illustrate the market cycle position.

Malls" and "Retail – 2nd Tier Regional Malls," were at the peak of the cycle (position 11) or in a recession phase (position 12 or higher).

In addition to the differences among property sectors and subsectors, market cycles are local in nature, meaning that market cycles differ significantly among cities for the same property type. For example, the apartment market cycle analysis as shown in Figure 4 demonstrates that local markets differ highly regarding their position. While some markets such as Jacksonville and San Diego are at the peak of their market cycle with extremely low vacancy rates, other markets such as Hartford and Milwaukee have very high vacancy rates with relatively low but positive rental growth rates. Furthermore, the national average is at cycle position 7 which is the start of the growth phase and has moved from position 6 (+1 position) in comparison to the previous quarter. In total, 30 markets improved their market cycle positions, indicated by "+1," "+2," or even by "+3" (such as the Washington, DC, market caused by continuing employment growth).

Figure 4: Apartment Market Cycle Analysis



Source: DCR (2007), p. 5.

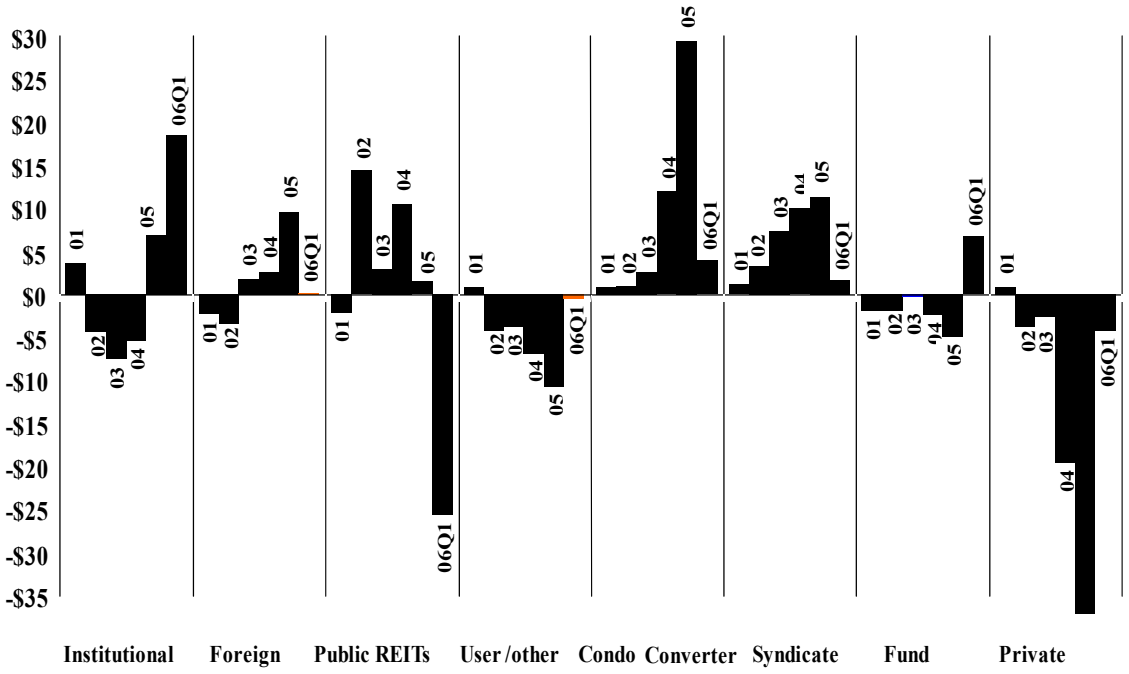
Based on the aspects mentioned before and as demonstrated by Figure 3 and Figure 4, the "physical market cycle" is defined as the changing demand and supply or space in a distinct local market for a specific property type that is reflected in occupancy rates and

rent level. This again shows the necessity of a metro-area-level analysis in terms of market cycle parameters. In contrast, the financial cycle (in this case, capitalization rates, "cap rates" in the private real estate asset market) pictures the demand for and supply of properties in the investment market.

Financial Cycle or Capital Flows (Private Real Estate)

In contrast to the physical market cycle, the financial cycle is a result of the capital flows to and out of real estate. This implies the capital flows to existing buildings as well as to developments. MUELLER (1995) showed that the separation of financial and physical market cycles can clarify the lag between occupancy and rental growth rates versus real estate prices.[26] For example, Figure 5 illustrates where capital flows to commercial real estate (private market) in the United States came from for the period 2001 to 2006. The diagram demonstrates that capital flows differ significantly among market participants. For example, private owners of real estate divested heavily in 2005 while other market participants, such as syndicates and condo converters, increased their investments in real estate.

Figure 5: Net Acquisition by Capital Sector in Billions for 2001:Q1 to 2006:Q1



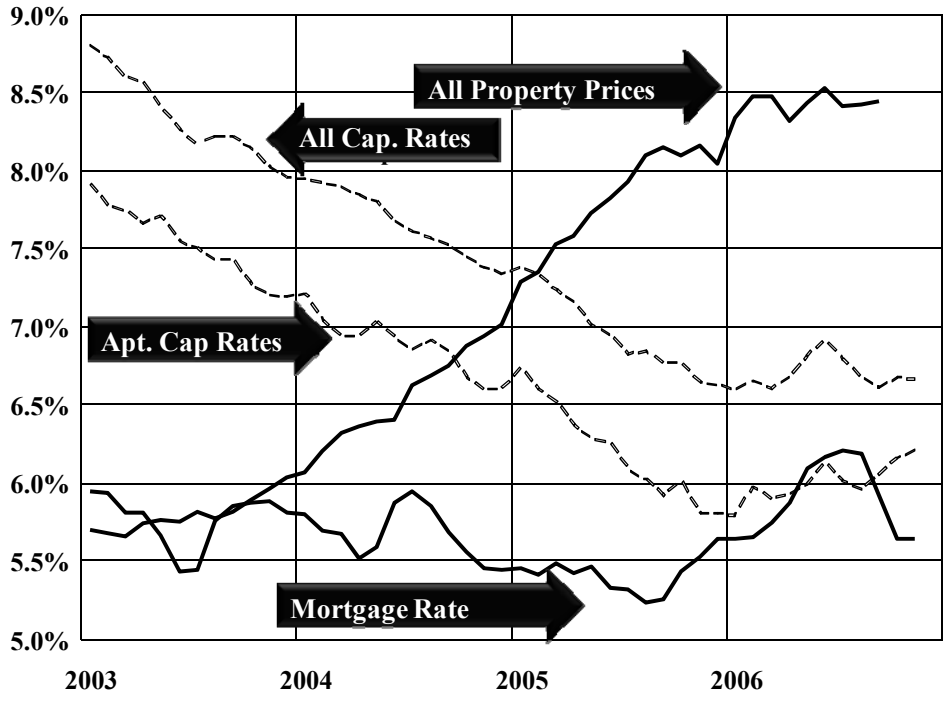
Source: Real Estate Capital Analytics, RECA (2006), no page.

[26] Cf. MUELLER, G.R. (1995), p. 47-48.

The reasons why private investors heavily divested from real estate may be explained by the favorable cap rates situation. For example, cap rates reached a historical low in 2006, proving the high investment demand for real estate. At this juncture, capital flows may not necessarily be tightly coupled to the physical market cycle of real estate.

As shown in the diagram below, decreasing cap rates represent increasing property prices. These cap rates can differ between property subtypes as pictured for apartments.[27] Since REITs are "public" real estate, the value of REITs is influenced but not determined in the private real estate market, in particular, because REITs have a mid- to long-term investment horizon and invest in income-producing real estate, and are restricted in their buying and selling. Consequently, the market capitalization or company value is determined by investors in the stock market and can be obtained by multiplying the current stock price with the common shares outstanding.[28]

Figure 6: Cap Rates, Mortgages, and Price Appreciation



Note: The mortgage rate refers to a 7- to 10-year fixed rate conduit loans for properties $5 million+.

Source: RECA (2006), no page, MUELLER, G. (2007), no page.

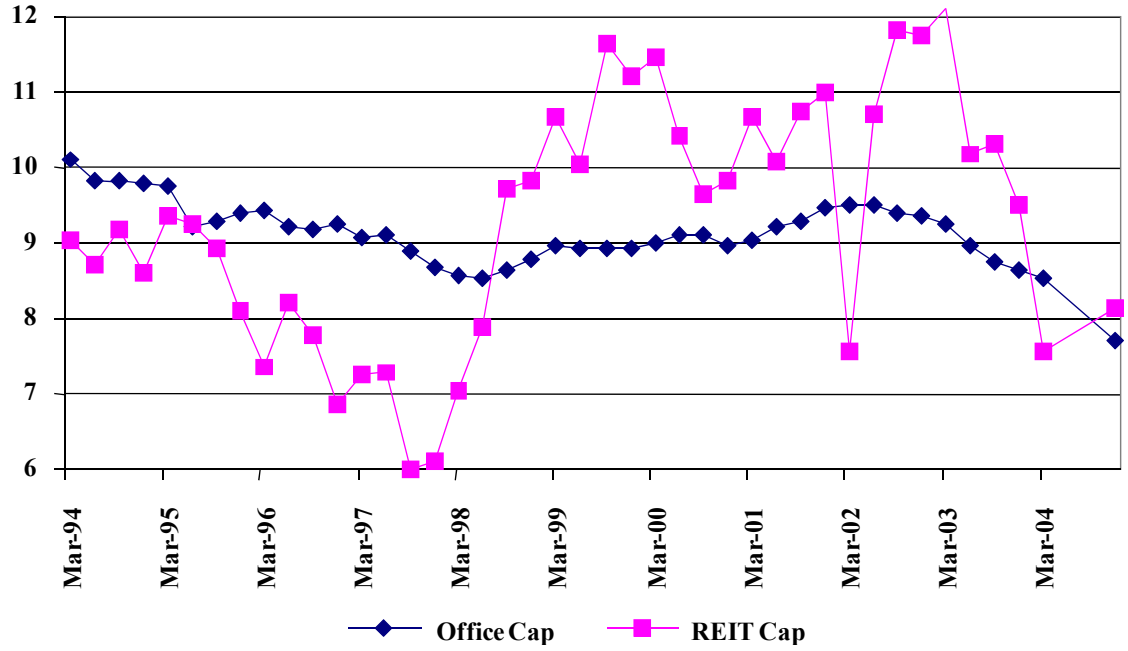
[27] Cf. WHEATON, W.C./NECHAYEV, G. (2005), p. 100 et seq.

[28] Cf. CHIANG, K.C.H./MING-LONG, L. (2007), p. 8.

Public versus Private Real Estate Pricing

As shown in the diagram, pricing of public and private real estate is not the same. To begin with, the "cap rate" of a REIT is the inverse of its FFO multiple. For example, an FFO multiple of 14.3x (1/FFO) equals a capitalization rate of 7%, and an FFO multiple of 16.7x equals a capitalization rate of 6%. At this, the analysis is based on forward multiples, not trailing multiples. Since the pricing of public real estate is subject to the volatility of the stock markets, the graphs for the Office REIT sector have a higher variance. Furthermore, the diagram shows that the pricing of public real estate can react faster to changing investor preferences. It is important to note that the performance indicator by means of pricing in this analysis refers to the pricing of public, not private, real estate.

Figure 7: Public and Private Capitalization Rates – Office Real Estate



Source: SNL (2007b), no page; NAREIT (2007b), no page.

2.1.2 Diversification and Investment Strategy

The term diversification as the contrary of specialization has been used widely in academia as well as professional boardrooms.[29] Generally, diversification is defined as a strategy to increase the variety of business, service, or product types within an

[29] Cf. ELLIS, C./WILSON, P.J./ZURBRUEGG, R. (2007); BNET (2007); MARONEY, N./NAKA, A. (2006); LEE, S.L. (2005); LEE, S./STEVENSON, S. (2005b); NELSON, T.R./NELSON, S.L. (2003).

organization and can be a growth strategy, taking advantage of market opportunities, or it may be aimed at reducing risk by spreading interests over different areas.[30] At this juncture, diversification or specialization can be achieved through external strategies such as acquisitions/disposals or through internal growth such as property developments in a particular market.[31]

Within the context of this thesis, "specialization" is conceptualized or refers to the degree of diversification regarding the geographic and property-type allocation of a REIT's asset base. In this way, specialization is limited to horizontal diversification, which involves expansion into a similar property (sub)sector or area. Another specialization or diversification strategy is vertical diversification, in which a REIT moves into a different level of the supply chain, for example, the degree to which a REIT is engaged in property development or specific tenant services. Apparently, vertical diversification can be upstream in the value chain, e.g., land acquisition or development, or downstream e.g. tenant services. Within the quantitative part of the thesis, the factor specialization is analyzed as conceptualized and is limited to the real estate investment strategy of a REIT.

In general, the investment strategy is an investor's plan of distributing capital among various investments, taking into consideration such factors as individual goals, risk tolerance, and horizon.[32] This implies that an investment strategy is always target-oriented. Since REITs heavily rely on the raising of capital via public capital markets, a transparent and focused investment strategy is essential.

In a broader sense, the investment strategy is information provided by the fund company intended to describe the strategy the manager uses to achieve the fund objectives in conjunction with the fund performance and investment style, to give the investor a better sense of how a fund might perform in the future.[33] Concretely, looking at the investment strategy for the real estate portfolio of a REIT, management has to convincingly demonstrate the target markets and property types where it can create

[30] Cf. INVESTOPEDIA (2007), no page; GLOSSARY (2007), no page; ANONYMOUS (2007b), no page.

[31] CF. PING, C./ROULAC, S.E. (2007); ELLIS, C./WILSON, P.J./ZURBRUEGG, R. (2007); BNET (2007), no page.

[32] Cf. GLOSSARY (2007), no page.

[33] Cf. INVESTOPEDIA (2007), no page; PYHRR, S.A./BORN, W.L./WEBB, J.R. (1990), p. 180.

shareholder value via superior skills regarding the value-added processes in a property's lifecycle.

For example, a healthcare REIT could be uniquely qualified if it has a superior operational concept or if its management has superior industry knowledge. In respect thereof, the investment strategy should refer to a particular growth strategy regarding the real estate portfolio of a REIT within a (sub)sector. In this connection, the importance of these underlying assets for the performance of REIT sectors and individual companies are the focal point of investigation in the analysis in the following chapter.

2.2 Research Framework

The dissertation follows a deductive approach, proceeding by formulating hypotheses that can be falsified by a test on observable data.[34] Consequently, the starting point of the dissertation is a literature review that sets the basis for the following analysis and the generation of hypotheses. At this juncture, the study aims to systematically generate hypotheses from theory and theoretical cognitions (deduction). In this light, the hypotheses are empirically tested to contribute to the understanding of market cycles and REIT performance by giving recommendations for academia and practice. Despite the theoretical problems associated with the hypothetico-deductive method,[35] the method is widely accepted as one of the most prominent theories of scientific methods.[36]

At this juncture, the study

1. Analyzes an empirically observable problem/phenomenon; the effect of physical market cycles on the profitability and pricing of REITs and defines the research objective.

[34] Cf. KORNMEIER, M. (2007), p. 35; BÄNSCH, A. (2003), p. 29.

[35] Corroboration is related to the problem of induction, which arises because a general case (a hypothesis) cannot be logically deduced from any series of specific observations. The argument has also been taken as showing that both observations are theory-laden, and thus it is not possible to make truly independent observations. One response is that a problem may be sufficiently narrowed (or axiomatized) as to take everything except the problem (or axiom) of interest as unproblematic for the purpose at hand.

[36] Cf. KORNMEIER, M. (2007), p. 78; BÄNSCH, A. (2003), p. 78.

2. Scrutinizes existing scientific theories as well as the state of research/empirical studies in the literature.
3. Evaluates and assembles the existing theories and empirical studies with regard to the research problem in a meta-analysis as a starting point for the formation of the hypotheses.
4. Gathers and assembles data about market cycles, the property holdings of REITs, and performance data of REITs.
5. Hypothesizes an explanation for the phenomenon/observations.
6. Deduces a consequence of that explanation (prediction) and formulates and performs an empirical analysis to test the hypotheses.
7. Waits for corroboration. If not, the hypothesis is falsified, and vice versa if corroborated.
8. Critically discusses the findings and puts them into perspective to derive meaningful recommendations.

Consequently, the following chapter describes the research questions that are the central point of the empirical analysis.

2.2.1 Assumptions and Premises

The following paragraphs illustrate the propositions that are taken for granted for the sake of the present analysis and discussion of the importance of the underlying assets and market cycles for the performance of REITs. In this way, the assertions about some characteristics of real estate and market cycles that underlie the current study are specified as follows:

- **Vacancy/occupancy:** The analysis applies or uses a concept of *economic* rather than *physical* vacancy. It is defined as the percentage of total occupied space in a market (occupancy rate). Inversely, the vacancy rate is an overall number that includes direct as well as subleased space, including owner-occupied space. The vacancy rates for the apartment, office, retail, and

warehouse property types are based on data from several national and local sources.[37]

- **Rents:** In line with industry practice, it is presumed that the price of apartment and hotel real estate is measured best by rent per unit per month for apartment and "average daily room rate" (ADR) as a moving average for hotel in contrast to rent per square foot per year. At this juncture, rent per square foot typically refers to gross lettable area.
- **Direction of cause-effect relationships:** Based on the state of research,[38] the study analyses the effect of space market fundamentals on Funds from Operation and not vice versa. Precisely, the effect of occupancy and rent levels as two major characteristics of space markets on FFO is investigated. In a second step, the empirical analysis assesses the effect of REIT-level profitability (measured by FFO per share) assuming that FFO determines stock prices. In this way, the dissertation takes a "bottom-up approach" analyzing the role of real estate fundamentals for earnings on the corporate level and the stock market performance accordingly.
- **Exclusion of other space market characteristics:** It is received that occupancy and rent levels adequately reflect supply via new developments, demand and net absorption. As a consequence, occupancy and rent levels are the sole parameters for measuring the physical market cycle position of a space market.
- **Rents versus occupancy:** It is accepted that it is necessary to measure two space market characteristics that are of similar importance, but react at a different pace to changes of the underlying economic factors that drive the supply of and demand for space, for example, office occupancy rates react faster than rent levels to a GDP increase.
- **Foreign property:** Due to the lack of data on the space market characteristics of foreign property and the negligible amount of foreign property as part of the asset holdings of REITs, the analysis excludes foreign property.[39]
- **Sector and company view:** The analysis assumes that it is necessary to investigate the research questions both for property sectors and individual

[37] Cf. PPR (2007a); PPR (2007b), no page.

[38] Refer to Chapter 3.1, p. 51.

[39] Refer to Table: 11: Excluded Hybrid and Mortgage REITs.

REITs to appropriately dissect the link between space markets and REIT performance. In this light, the analysis takes a "portfolio manager view" (sectors) and a "stock analyst view" investigating individual companies. Also, the sector view is based on property sector indices to account for the changing size/market share of individual companies that are investigated in further detail separately.

- **Property subtypes:** The analysis does not take into account the age, building class, and property subtype, e.g., "full-service" versus "limited-service" hotels when combining the property holdings with space market data. This means that the number of hotel rooms is linked with the space market characteristics of the corresponding metro-area market for each metro area separately.
- **USA (other):** It is assumed that the national average rent or occupancy level is an adequate space market proxy for the properties that are not part of one of the 48 markets, e.g., smaller MSAs such as Colorado Springs.
- **Calculation of "Sales Factor":** The regression analysis includes a sales factor that is the sum of the properties in square feet sold in period "*k*." At this juncture, the different samples may be subject to going private in the REIT industry. As shown, most samples that went private occurred in 2005 and 2006 and in the office and hotel real estate sector.[40] Going private means that a company transforms from public to private ownership status.[41] Reasons can be that the cost of being public are too high or management could feel that it could get an adequate price by going private that it does not in the stock market.[42] In this way, a company going private is different from a merger between or acquisition of a REIT by another REIT because the properties are still part of the "overall property portfolio" of the REITs. Properties sold in a method going private are included in the sales factor calculation.

2.2.2 Real Estate Investment Trust-Real Estate System

The following REIT-Real Estate System (RRES) is core to the analysis because it illustrates the research questions and links that are investigated in the following

[40] For example the going private of Equity Office, La Quinta, Center Point Properties or Arden Realty.

[41] Cf. GLEASON, K./PAYNE, B./WIGGENHORN, J. (2007), p. 208.

[42] Cf. KINDLER, R.E.A. (2008), p. 93.

chapters. Figure 8 shows the different types of markets that are consolidated in the context of the analysis to evaluate the importance of physical market cycles for REIT performance. It is shown that REITs operate in parallel asset markets: the stock market and the real estate markets and illustrates the aspects excluded.

Moreover, "the real estate market" can be further subdivided into the "physical" or space market ("rental market") and the real estate financial or asset market ("investment market"). These two markets are the drivers of property values as illustrated. Although the space market is the more fundamental real estate market because it reflects the spatial requirements, both are of equal importance to return performance. Nonetheless, space and investment markets have different characteristics. Due to the characteristics of real estate,[43] space markets are highly fragmented and depend on mainly local factors. In addition, the demand and supply for space – resulting in the respective amount of net absorbed space (or rooms/units for hotel/apartments) – are reflected in the occupancy levels and rental growth rates.

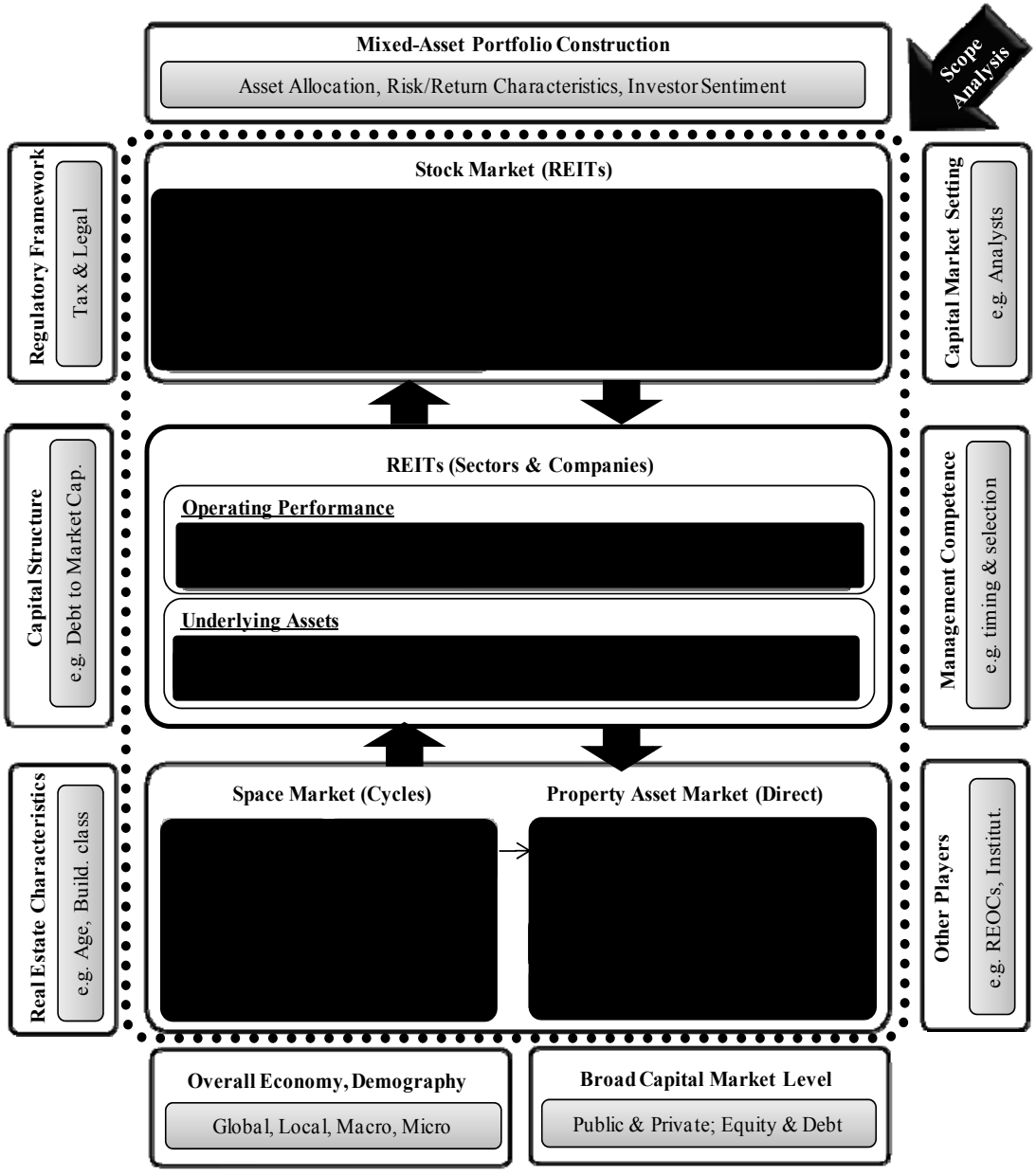
In contrast, real estate investment markets are less "market specific," meaning that capital is more flexible and that investors focus on competitive prices and returns regardless if the asset is in market "A" or "B." Also, the broad capital markets represent public and private equity and debt sources that "supply" or "demand" real estate assets depending on their individual preferences and investor sentiment. In addition to REITs, various other players compete for appealing real estate investment opportunities. These demand-and-supply factors are reflected in the capitalization rates used to describe the price for real estate properties.

Looking at the diagram below, the dotted line defines the scope of the analysis. Although the factors outside the dotted line such as the capital structure of REITs or overall economic factors such as interest rates are essential for a complete analysis of REITs, the study focuses only on the markets and areas within the frame. For example, the analysis takes rent and occupancy as an indicator of the space market position of a metro area but does not ask how and which demographic and economic factors determine the market cycle factors. In almost the same manner, the analysis targets Fund from Operation as the key figure for the operating performance and evaluates the

[43] Cf. GUILKEY, D./MILES, M./COLE, R. (1989), p. 71.

effect of space markets but not of the capital structure.[44] Consequently, the illustration clearly defines the limitations of the analysis that have to be taken into consideration when interpreting the results.

Figure 8: Scope of the Analysis



Source: SNL REAL ESTATE, PFEFFER.

Typically, space and real estate asset markets are external to a REIT. Nonetheless, the two markets define the value of the underlying assets of a REIT in the private market. Theoretically, the stock market should evaluate and represent the value of the

[44] Cf. Chapter 2.3.2, p. 45.

underlying assets.[45] Despite other factors, particularly the management and the capital structure of a REIT, the property holdings of REITs represent a central determinant of REIT performance. Depending on the market exposure of these properties, the earnings of a REIT should increase or decrease if the real estate markets are subject to changes. Since Generally Accepted Accounting Principles (GAAP) earnings are a suboptimal measure for the profitability of a REIT (due to the large amount of depreciation), FFO and AFFO have evolved as an industry standard to determine the earning power of REITs.[46] Also, this is an important difference to REITs in Europe that do not have the same amount of regular depreciation because of the "fair value" approach to investment properties based on the International Financial Reporting Standards (IFRS).[47]

Having described the underlying real estate markets and the role of the property holdings, FFO are used as a company-level earnings performance measure. The value of a REIT is decided in the capital markets, by the value of its shares that are traded at an exchange. As depicted in the diagram, the share price is the result of investors buying or selling REIT stocks. At this juncture, the total return of a REIT consists of two parts, the distribution of dividends and stock price changes. In addition to these factors, other measures have evolved to determine the value of REITs, for example, FFO multiples that put FFO in relation to the stock price to value REITs. Consequently, FFO multiples show the "relative value" of a REIT.

This illustration is necessary to point out the relationships between the different factors that are part of this analysis (or excluded). Precisely, the dissertation links space markets with the FFO earnings of REITs as well as their pricing. In this way, the analysis looks at the effect of space markets on profitability as well as profitability on pricing. Moreover, the REIT-Real Estate System is the foundation for the formulation of hypotheses that are presented in the following chapter.

2.2.3 Theoretical Frame of Reference

Having specified the purpose of the study and the research questions, the present chapter discusses theories and concepts that frame the object of investigation. In this

[45] Compare Chapter 2.2.3: Theoretical Frame of Reference, p. 20.

[46] Refer to Chapter 2.3.2, p. 42 for a description of FFO and AFFO.

[47] Refer to Chapter 5.6, p. 291.

context, capital market theory (CMT) is the first theoretical pillar of the study, which assembles models − especially asset-pricing models − that target the pricing and analysis of securities. Consequently, CMT is a generic term for different kinds of models. Typically, these models refer to shares or types of shares. Since REITs operate in parallel asset markets, real estate markets are an essential part of the analysis in addition to the stock market. Therefore, an interdisciplinary understanding of real estate markets is an important point of reference and forms the second pillar of the theoretical framework.

Asset Pricing and Security Analysis

Important cornerstones of CMT are the Modigliani-Miller-Theorem (MMT), the Black-Scholes Option Pricing Model (OPM), and particularly the Capital Asset Pricing Model (CAPM). The CAPM is a model for the generation of expected equity returns. The model is based on the assumption that returns are the result or reward for taking an additional amount of risk. It can be split into a stock-specific risk and a market risk. Since the specific risk of a share can be mitigated by diversification policies, an investor should not be compensated for exposure to this. Therefore, expected returns should be a function of the stock's response to returns on the market as a whole. This is given by the beta of a stock.[48]

In particular, capital asset pricing models are important for macro-level investment analysis. At this juncture, assets pricing theories can be applied in three major ways:

1. Equilibrium pricing models evaluate and understand reasonable expected returns on investments in different asset classes, investment products, or shares.
2. Identifying specific assets or shares that are mispriced relative to their long-term equilibrium.
3. Quantifying how the stock market prices risk and return expectations, for example, regarding portfolio construction.

[48] Cf. HOESLI, M./CAMILO, S.M. (2007), p. 60; NAJAND, M./LIN, C.Y./FITZGERALD, E. (2006), p. 168 et seq; GYOURKO, J./NELLING, E. (1996), p. 494 et seqq.

In particular, the second of the three applications is relevant for the present study because it implies that asset prices and expected returns are codetermined.[49] Looking at REITs, the space market is by far the most important driver of property cash flow (in addition to the management and capital structure of REITs) that determines property value and FFO, which should be reflected in the stock price depending on the expected return required by investors.

CMT includes different strands of literature as well as approaches and models to explain the performance of securities. While traditional capital markets theory assumes that markets are efficient based on the assumption that investors are rational, new schools of research, especially behavioral finance, assumes the opposite.[50] Nonetheless, the application and suitability of a model applied may depend on the specific problem analyzed. Furthermore, the complexity of stock markets, which is tightly coupled with human behavior, complicates the analysis of stock performance.

At this juncture, various approaches and models exist in theory and practice to explain the performance of securities, for example, technical analysis, Arbitrage-Pricing-Theory (APT), fundamental analysis or the Random-Walk-Hypotheses (RWH).[51] These are trading theories aiming to explain the mechanisms of stock price movements. The RWH critically analyzes stock price movements and finds that stock prices cannot be forecasted but follow a random walk.[52] Technical analysis does not incorporate economic indicators or company data but analyzes the action of the market itself, for example, stock charts, indices, trading volumes, and stock price premiums. Technical analysis is not based on specific links between stock price movements and fundamentals. Instead, price movements and regularities are simply claimed. Also, technical analysis is not scientifically proven and is simply based on historic stock price data.[53]

According to fundamental analysis, stock performance is based on available data on companies, industry sectors, and the economy. The focal point of the fundamental analysis is the assumption that stock prices fluctuate around the “intrinsic value” of a

[49] Cf. GELTNER, D., et al. (2007), p. 562.

[50] Cf. PETERS, E. (2003), p. 225

[51] Cf. AMBROSE, B.W./ANCEL, E./GRIFFITHS, M.D. (1992), p. 25-28.

[52] Cf. KLEIMAN, R.T./PAYNE, J.E./SAHU, A.P. (2002), p. 279 et seq.

[53] Cf. KAKATI, M. (2005), p. 513 et seq.

company. The intrinsic value is an analytically and practically defined earning estimate that is justified by facts. This can be an adequate transaction price as well as a long-term expected market price. Fundamental analysis presumes that the difference between the intrinsic value and the actual market price cannot persist on a long-term basis.[54] This implies that market participants realize the intrinsic or "true value" of the company/REITs.

At this juncture, the determination of the intrinsic value poses the largest challenge. In this connection, fundamental analysis differentiates between direct and indirect stock valuation methods. A direct valuation model could be based on the dividend and earning potential of a company. The simplest models discount the dividend payments per share and discount them with a discount factor. For example, the Gordon growth model is a modification of the discounted dividend model. This is a procedure to value securities or companies. The Gordon growth model is used to provide difficult-to-resolve valuation issues for different purposes, e.g., business transactions. It assumes that a company issues a dividend that has a current value that grows at a constant rate and that the required rate of return for a stock is constant and equals the cost of equity for that company.[55]

In the context of REITs, FFO and "Adjusted Funds from Operation" (AFFO) have evolved as the most important earning measures. In a pre-step, real estate markets as the determinants of FFO are analyzed and linked with the property holdings. To summarize, capital market theory provides an appropriate framework for the pricing of assets. Also, CMT has a central role in the structure of finance theory because finance analyzes the behavior of companies in issuing stock and investing in assets.[56] Nonetheless, CMT as the sole point of reference does not sufficiently explain the link between space markets and REIT returns, particularly in view of the heterogeneous characteristics of real estate assets that are different from other asset classes.[57]

[54] Cf. DESTEFANO, M. (2005), p. 42 et seq.

[55] Cf. RUTTERFORD, J. (2004), p. 115 et seqq.

[56] Cf. STAPLETON, R.C. (1999), p. 2.

[57] Cf. LIAO, H.-H./MEI, J. (1998), p. 279.

Gordon Growth Model

The Gordon dividend growth model belongs to the discounted cash flow models. These models aim at determining the value of a stock or business by discounting the future dividends (D) at a constant rate (g) and assume that the required rate of return remains at a constant rate (k) equaling the cost of equity of the stock or company. This involves summing the infinite series that determine the value of price current P.[58]

Since the model assumes that earnings growth is constant in the form of perpetuity, the model has been criticized because the assumption that the growth rate is constant is often not fulfilled in practice, particularly for growth stocks, and cost of capital of companies vary over time for most companies. Nonetheless, the Gordon growth model is a valuable approach to determine the intrinsic value of a stock based on the future growth expectations as shown in the formula below.[59]

Equation 1:

$$P_0 = \frac{D_1}{k - g}.$$

Note: Commonly, the next value of D is used given by $D_1 = D_0(1 + g)$

Source: GELTNER et al. (2007), page 595.

Looking at the valuation of a REIT in the stock market, D and g deal with the REIT's future cash flow such as AFFO and dividends. Additionally, k is based on a REIT's equity risk as perceived by investors in the stock market. In this way, the Gordon growth model is a shortcut approach to price REITs based on their future cash flow and dividend distribution expectations.[60]

Interdisciplinary Understanding of Real Estate

In addition to capital market theory, which focuses primarily on the stock market, the field of real estate is of equal importance for this dissertation. Following SCHULTE/SCHÄFERS (2005); GRAASKAMP (1991), this dissertation is based on an

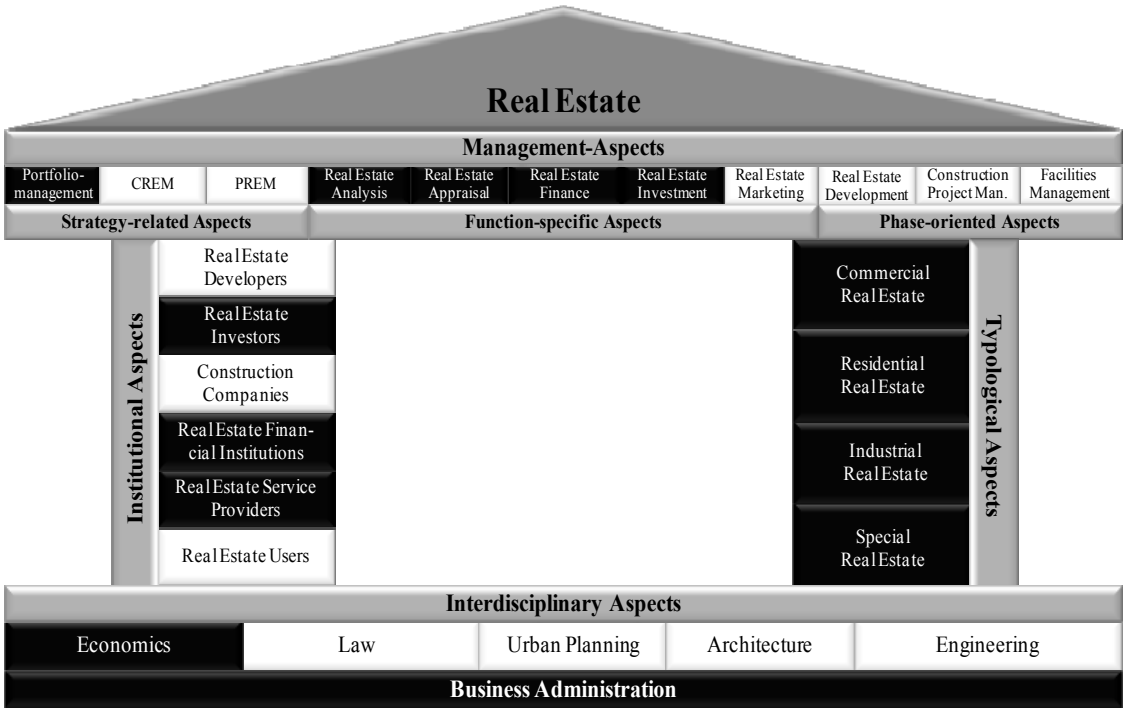
[58] Cf. GELTNER, D., et al. (2007), p. 595.

[59] Cf. Ibid., p. 594 et seqq.

[60] Cf. Ibid., p. 595.

interdisciplinary understanding of real estate. At this juncture, SCHULTE/SCHÄFERS (2005) illustrate the openness and interdisciplinary character of real estate in the house of real estate, as pictured in Figure 9. It is illustrated that real estate studies ("Immobilienökonomie") need to go beyond investment and finance to explain real-life decisions and economic agents dealing with real estate. Although business administration forms the core of real estate studies, a multidimensional understanding is necessary as a sufficient condition for meaningful results. This complexity is illustrated in the house of real estate. Most important, real estate as an academic discipline aims at contributing to the state of research as well as at supporting the decision-making process in practice with applied research. In this way, it is problem-oriented and is targeted toward recommendations for the management of real estate.[61]

Figure 9: The House of Real Estate



Source: SCHULTE/SCHÄFERS (2005), p. 47.

Analyzing the link between real estate markets and REIT performance, the thesis touches upon the following aspects that are classified in the "house of real estate" and highlighted accordingly in Figure 9. At this juncture, the typological- and function-

[61] Cf. SCHULTE, K.-W./SCHÄFERS, W. (2005), p. 52-58, GRAASKAMP, J. (1991), p. 40. Also see BONE-WINKEL, STEPHAN (1997), SCHÄFERS, WOLFGANG (1997).

specific aspects are of particular importance for investors in and analysts of REITs as well as for the management of REIT companies.

1) **Institutional Aspects**
    a. Real estate investors
    b. Real estate financial institutions
    c. Real estate service providers
2) **Typological Aspects**
    a. Commercial real estate
    b. Residential real estate
    c. Industrial real estate
    d. Special real estate
3) **Interdisciplinary Aspects**
    a. Economics
    b. Business administration
4) **Management Aspects**
    a. Portfolio management
    b. Real estate analysis
    c. Real estate appraisal
    d. Real estate finance
    e. Real estate investment

In terms of institutional aspects, the findings of this analysis are important for investors in real estate and REITs because it is necessary for this group to understand to what extent REITs reflect the characteristics of the underlying assets. Also, a multitude of real estate financial institutions, for example, financing institutions, are interested in the issue of how REITs are affected by market cycles in the respective property sectors. In addition, real estate service providers in a broader sense, such as rating agencies or analysts, aim to evaluate and price REITs appropriately, taking into consideration fundamental factors and market developments.

By means of typological aspects, the thesis deals with the five most prominent commercial property types: office, industrial, retail, apartment, and hotel real estate. Following the classification as represented by the house of real estate, apartment real

estate combines the characteristics of residential real estate with the attributes of commercial real estate in contrast to single-family home ownership, which is not commercial real estate. Due to the characteristics of hotel real estate, particularly regarding the operating characteristics of hotel real estate, the divergent market cycle in comparison to the "traditional" property types and the particularities of hotel (and healthcare) REITs,[62] HO-REITs are conceptualized as specialty real estate in the context of this study.

The interdisciplinary aspects in the dissertation are limited to economics and business administration in the main part. Since the study deals with the relationship between the pricing of REITs in the stock markets and the underlying real estate markets, economic factors are essential for understanding why and how physical market cycles evolve and change over time depending on macro- and micro-economic factors.

Fourth, by management aspects, the results of the analysis are of interest for portfolio management and real estate investment and finance, on a sector and on a company level. This means that it is important for portfolio managers constructing mixed- and single-asset portfolios to understand the consequences of investment positions in REIT sectors and companies and the corresponding market cycles accordingly. In addition, the study performs a detailed real estate analysis in the way that it scrutinizes market cycles of property types as well as different local markets. Altogether, these aspects are central for the definition of a physical market cycle construct as discussed in the following section.

2.2.4 Construct Definition Physical Market Cycle

A construct − also called the latent variable − describes an actual situation or fact that is not observable directly. Therefore, the construct is measured by observable facts and circumstances that make the construct ascertainable. At this juncture, the development of a construct is carried out in two steps: first, the development of a concept that refers to the definition and collection of the relevant dimensions and, second, the development of an adequate measuring instrument.[63] Overall, the aim of the construct measuring

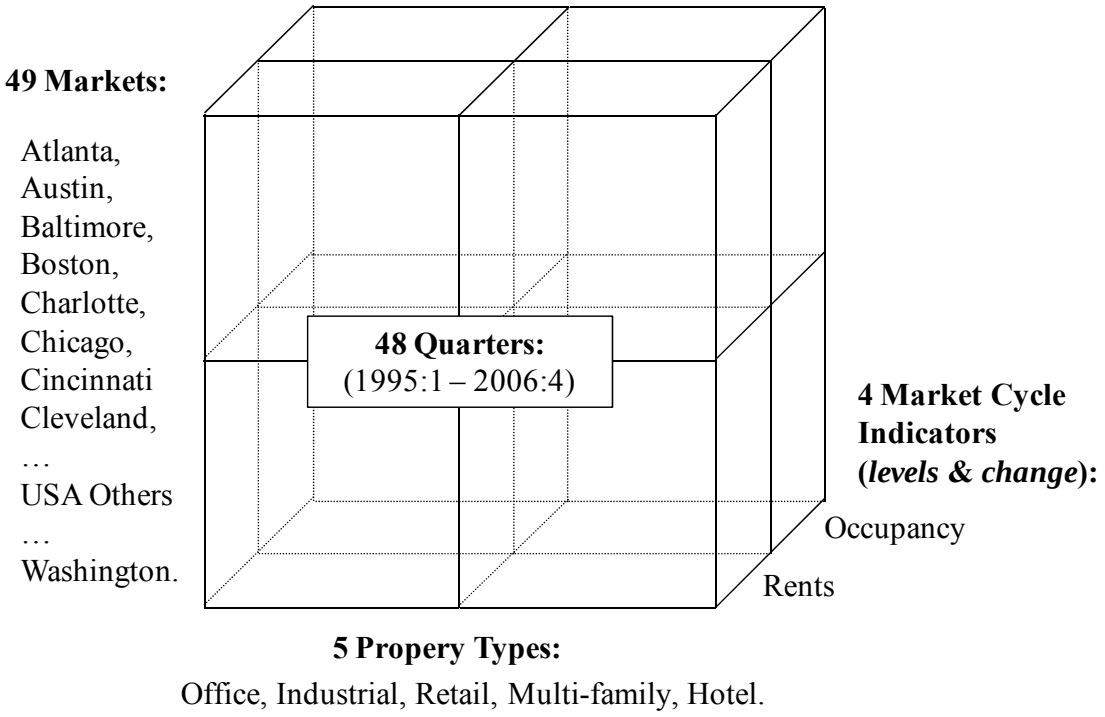
[62] Refer to Chapter 2.3.2, p. 42 for a description of the special features of hospitality and health care REITs.

[63] Cf. HOMBURG, C./GIERNING, A. (1996), p. 6.

process is to specify the link between the observable indicators and the interested construct to make the construct observable.

In this study, the physical market cycle is the construct. The "physical market cycle" is an abstract concept that, by itself, is not directly observable and is defined differently by various scholars,[64] for example, among property types and regions, but can be measured by defining appropriate indicators. Theoretically, each building has its own physical market cycle that is determined by various endogenous and exogenous factors. In the context of this analysis, the physical market cycle position is based on 49 space markets that cover all national locations excluding foreign property, two indicators that reflect and characterize the market cycle, the five most prominent, commercial property types as shown in the diagram below. As a consequence, the analysis pictures the space market cycle in the U.S. over the sample period with more than 23,000 data points depending on property type, market and space market cycle, which is a relatively precise and coherent basis for the sake of this study that is calculated separately for every quarter.

Figure 10: Physical Market Cycle Concept



Source: SNL REAL ESTATE, PFEFFER.

[64] Refer to Chapter 2.1.1, p. 10 for a definition of the physical market cycle.

Note: "USA (Others)" summarizes B-Metro Areas and Micro Areas.

The physical market cycle concept sets the necessary basis for the market cycle position of every REIT sector and company that is part of this analysis. In the second step, the physical market cycle position is connected with the underlying assets and performance of REITs. The following chapter illustrates how the research questions are operationalized.

2.2.5 Research Questions

The aim of this section is to specify and operationalize the research questions that are the core of this study. The dissertation explores the nature of REIT performance and two key characteristics posited to be associated with the earnings and pricing of REIT stocks: the occupancy and rents (and their relative change from period to period in terms of growth rates). The space market cycle indicators are analyzed for 49 markets and weighted and aggregated for the five largest REIT property sectors and the respective companies in every quarter between 1995:Q1 and 2006:Q4. First, the study examines the nature of space and asset markets and combines it with the respective exposure in the corresponding local markets. Second, the dissertation theorizes that REIT performance depends on the characteristics of the underlying assets. Third, the analysis models the key factors occupancy and rent levels as mediating variables. Fourth, the strength of the relationship between the factors, including time lags, is analyzed and specified in an integrated model.

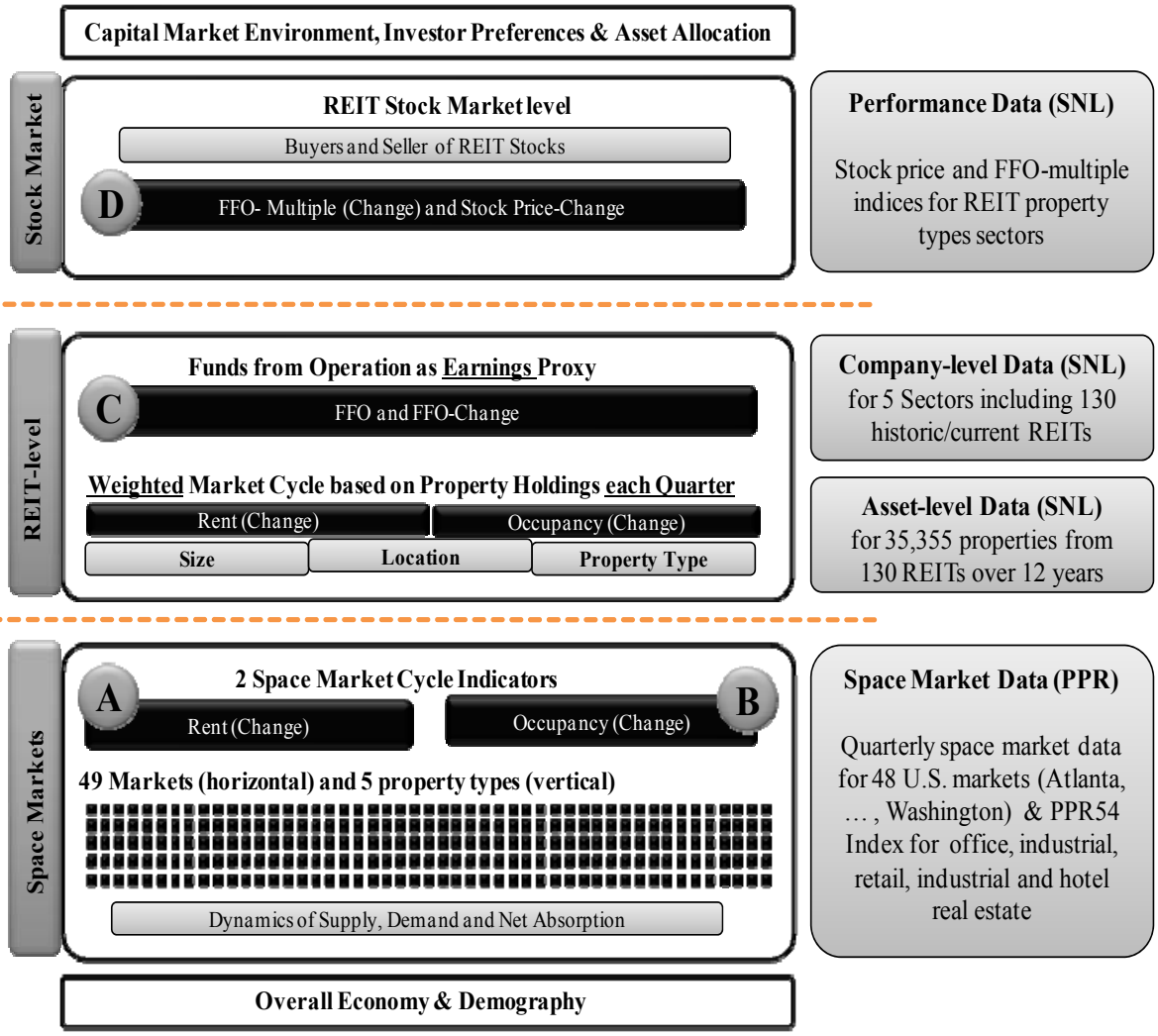
As this juncture, the main research question of the dissertation project is the question to what extent the underlying real estate markets determine the return characteristics of REITs. A research question is one that yields hard facts to help solve a problem, produce new research, add to theory, or contribute to the state of research.[65] In this way, the following research questions deal with facts, observed in the U.S. REIT and real estate market during the period 1995 to 2006. The research questions aim to provide answers that explain, describe, identify, substantiate, predict, or qualify.

[65] Cf. CBDD (2008), no page.

Based on the diagram below that aims at illustrating the most important parameters and links analyzed in the study, the dissertation investigates four types of relationship in which the research questions are clustered:

1. What is the link/lag between "A" and "B"?
2. What is the link/lag between "A" and "B" with "C"?
3. What is the link/lag between "A" and "B" with "D"?
4. What is the link/lag between "C" and "D"?

Figure 11: Specification of Research Questions for Space Markets, FFO, and Pricing



Source: SNL REAL ESTATE, PFEFFER.

These questions imply a detailed analysis of the time lags between the different variables, for example, the question if or to what extent the pricing of REITs lags a change in rent levels of the underlying portfolio. Moreover, these research questions implicate the answering of the following questions:

- If there is a structural relationship between the variables analyzed, is the link time varying or persistent?
- Does the exposure to market cycle differ among sectors and individual companies – and if yes, to what extent?
- Have REITs achieved higher rent and occupancy levels than the overall market?
- Is it advantageous for investors in and the management of REIT companies to include market cycle analysis in their decision-making process?

These research questions are operationalized in the empirical analysis and are the basis for the hypotheses specified in the research framework.[66]

Having defined the research questions, the following paragraphs illustrate and classify the research questions. Due to the large number of research questions and the complexity of the topic, it is necessary to classify the topics that are key to the analysis. Also, this division lays the foundation for the hypotheses and the construction of a REIT-Real Estate System. Typically, there are four types of research questions:[67]

- Description: Picture, describe, and realize a topic or process differentiated and intensively.
- Prognosis: Forecast future events and evaluate the consequences.
- Explanation: Comprehend and explicate a topic by understanding the relationships and coherences.
- Technology: Act and design to achieve an objective.

As shown in Figure 12, the study deals with three *types* of research questions that are operationalized in the following analysis. First, it is vital to analyze and distinguish separately between the different markets that are dealt with in the empirical analysis. The analysis does not picture the *actual* rents or occupancy levels of REITs but their theoretical rents and occupancy levels based on their market exposure. Therefore, the first tier of the analysis links the property holdings of REITs in every period with the corresponding quarterly space market data to calculate the physical market cycle of REIT sectors and companies. In this way, this step of the analysis contributes to a better understanding of the company- and sector-specific differences in terms of investment

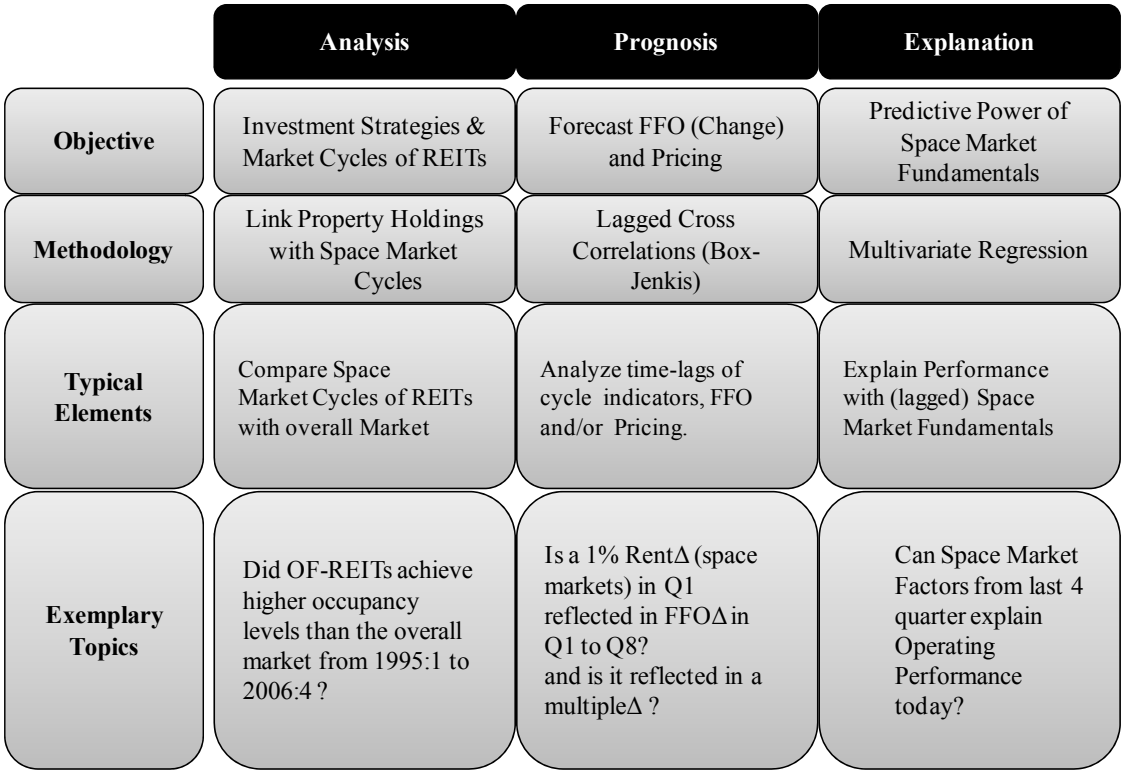
[66] Refer to Chapter 3.2, p. 72.

[67] Cf. KORNMEIER, M. (2007), p. 30.

strategy (e.g., different specialization strategies of REIT property sectors and companies) and compares the market cycle of REITs to the overall market. This question is of importance for academia and professionals because it empirically proves whether REITs were able to select and time metro areas with superior rent growth or occupancy levels.

Second, the results of the first tier of research questions are co-mingled in a systematic way to investigate the second type of research questions. These questions have a different aim and apply a completely different methodology. Also, the questions particularly focus on the strength of the relationship between the different markets and variables under consideration of time lags. Moreover, the sector- and company-specific differences are of particular interest in this context. Also, the findings are the essential basis for the development of a forecast model that pictures the structure and chronology of the factors.

Figure 12: Types of Research Questions



Source: SNL REAL ESTATE, PFEFFER.

The third group of research questions refers to the *explanation* of the structural relationships between the factors. In this way, the research questions aim to identify basic phenomena about the link between space markets, Funds from Operation, and

REIT performance. In contrast to the preceding tier, this part of the analysis does not focus on bivariate links. Again, the sector- and company-specific differences are of particular importance to derive and give meaningful recommendations for the management of and investment in REITs for academia and practice. Furthermore, the classification of research questions sets the ground for the following hypotheses. Subsequently, the following enumeration presents the most important research questions.

Market Cycles of Real Estate Investment Trusts

1. Have REITs permanently outperformed the overall market in terms of space markets (Occupancy and Rent Levels) via timing and selection abilities of the management? (→ "Better Space Market Selectors")
2. Are there – and if yes, to what extent – sector- and company-specific differences?
3. Is there a difference between the performances by occupancy versus rents?
4. Does this outperformance results from a permanent outperformance or from phases?

Real Estate Investment Strategies of Real Estate Investment Trusts

5. What were the investment strategies of REIT sectors and companies in terms of specialization/diversification by NCREIF regions versus markets?
6. What were the investment strategies of REIT sectors and companies on a regional level (NCREIF) and/or investment strategies on an MSA level?
7. What were the investment strategies of REIT sectors and companies (acquisition and sale) in terms of the size of the assets bought?
8. To what extent are real estate investment strategies different between sectors and companies?

Association/Time Lags of Space Market, Earnings, and Pricing Factors of REITs

9. Is there an association – and if yes, at what time lag is the highest association – between the space market factors of REITs?
10. Is there an association – and if yes, at what time lag is the highest association – between space market factors and the earnings of REITs?
11. Is there an association – and if yes, at what time lag is the highest association – between space market factors and the pricing of REITs?
12. Is there an association – and if yes, at what time lag is the highest association – between the earnings and the pricing of REITs?

Predictive Power of Space Market, Earnings, and Sales Factors for the Pricing of REITs

13. Can current and lagged space market factors (occupancy and rents) predict FFO in an integrated regression model?
14. Can current and lagged earnings and space market factors predict the pricing of REITs in an integrated regression model?
15. Does the inclusion of a sales factor (share of properties sold by a REIT) increase the explanatory power of the regression model for REIT pricing?

Based on the research questions, the hypotheses are specified in chapter 3.1.[68]

2.3 Fundamentals of Real Estate Investment Trusts

2.3.1 Structure, Parallel Asset Markets, and Specialization of Real Estate Investment Trusts

Due to the unique regulatory framework of REITs and the characteristics of real estate as an asset, REITs act in parallel markets. “Parallel” means that REITs are active in the stock market on the one hand and in the private property market on the other hand. Furthermore, the private property market can be further subdivided in different local

[68] Cf. Chapter 3.1, p. 50.

markets that can be broken down further for different property types and submarkets. The sometimes significant differences in the valuation of real estate in the stock market and private property markets can be illustrated by the spread between NCREIF Values and Cash Flows (unsmoothed) and NAREIT Values and Cash Flows (unsmoothed) to compare REIT stock prices to property Net Asset Value (NAV), for example.

The described parallel market setting is a unique feature that distinguishes REITs from most other non-real estate firms that are listed at the stock market. Generally, the REIT market (indirect) tends to lead the private market in most cases. In case that valuation of real estate differs between these two markets, REITs can realize positive "Net Present Value" investments either by selling or buying in the private market.[69] Several researchers have analyzed the performance of public and private real estate in various contexts, for example, RIDDIOUGH/MORIARTY/YEATMAN (2005); GILIBERTO (2004); PAGLIARI JR/SCHERER/MONOPOLI (2004); MUELLER/MUELLER (2003); TULUCA/MYER (2000) examining whether it is possible to "arbitrage" between the two markets finding mixed results.[70] Although both markets determine the property value based on the cash flow of the property as one component, the price component is determined in different markets. In addition to the price of REITs being decided in the stock market, the most important tax and regulatory constraints that go along with being listed at the stock market and with the election of REIT-status are described in the following section.

Real Estate Investment Trusts and Specialization

Since the emergence of REITs in the United States in 1960, REITs have changed from rather diversified, passive investment vehicles to specialized, integrated operating companies.[71] In general, REITs are classified into three categories: equity, hybrid, and mortgage REITs.[72] Table 2 shows the diversity of the REIT industry in the United States with a multitude of sector-specific companies. In addition to the "traditional" real estate sectors, several companies successfully offer real estate–related services and

[69] Cf. PAGLIARI JR, J.L./SCHERER, K.A./MONOPOLI, R.T. (2004), p. 109.

[70] Cf. RIDDIOUGH, T.J./MORIARTY, M./YEATMAN, P.J. (2005); GILIBERTO, M. (2004); PAGLIARI JR, J.L./SCHERER, K.A./MONOPOLI, R.T. (2004); MUELLER, A.G./MUELLER, G.R. (2003); TULUCA, S.A./MYER, F.C.N. (2000).

[71] Cf. PFEFFER, T. (2006), p. 44; GRAFF, R.A. (2001), p. 99 et seq.

[72] Cf. PAYNE, J.E./MOHAMMADI, H. (2004); REYNOLDS, T. (1997), p. 77.

investment in "non-traditional" sectors such as self-storage. Since the object of investigation is only equity REITs, the diagram shows only equity REITs.

Moreover, it is shown that REITs combine relatively constant dividend yields with the volatility of the stock market, as reflected in the total returns for 2006 and 2007. Furthermore, the diagram illustrates that REITs nowadays also offer the possibility of investing in property subsectors such as shopping centers, regional malls, or free-standing for the case of retail REITs. Another particularity of REITs is that property types with similar leasing characteristics and tenant structure such as industrial and office are combined in one operating company.

From an investor's standpoint, a focused investment strategy is beneficial because specialized vehicles are more transparent. Since the individual property types have different drivers or react differently to changes in the economic environment, a diversified REIT is more difficult to analyze. This aspect is particularly important for non-traditional property sectors with complex operating concepts and a high demand of expert knowledge.

Table 2: REIT Sectors and Subsectors

Property Sector	Total Return		Dividend	Number	Equity Market	Implied Market	%
Subsector	2007	Year to Date	Yield	REITs	Capitalization	Capitalization	
Industrial/Office	-14.86	-8.21	5.22	26	66,352,726	73,088,228	24%
Industrial	0.38	-12.48	4.54	6	23,005,727	24,024,650	8%
Office	-18.96	-5.83	5.13	15	35,915,913	40,185,810	13%
Mixed	-33.09	-4.94	7.85	5	7,431,087	8,877,768	3%
Retail	-15.77	-6.45	5.25	26	74,645,168	85,695,277	29%
Shopping Centers	-17.68	-5.52	5.21	14	30,921,869	31,883,917	11%
Regional Malls	-15.85	-6.47	5.14	7	37,514,007	47,583,202	16%
Free-standing	-0.43	-11.33	6.19	5	6,209,292	6,228,158	2%
Residential	-25.21	4.63	5.07	15	40,719,282	43,938,725	15%
Apartments	-25.43	4.84	5.10	15	38,950,921	41,903,774	14%
Manufactured Homes	-19.34	0.24	4.47	4	1,768,360	2,034,951	1%
Diversified	-22.29	-2.38	5.07	8	17,730,254	19,711,685	7%
Lodging/resorts	-22.37	-4.85	6.91	10	18,312,191	18,788,581	6%
Healthcare	2.13	-7.26	5.99	11	23,830,374	24,194,756	8%
Self-storage	-24.82	9.48	3.26	4	16,226,164	16,293,412	5%
Specialty	14.56	-8.91	4.31	6	16,120,720	16,834,159	6%
Equity Index	**-15.69**	**-4.55**	**5.23**	**110**	**273,936,879**	**298,544,824**	**100%**

Source: NAREIT (2008d), no page.

In this connection, the "New REIT Era" has seen that management expertise is more effective in focused vehicles. In their analysis, Capozza/Seguin (1999) found that the advantages from a high degree of specialization are based on a favorable valuation at the capital market. Starting with the structuring of specialized healthcare REITs in the late 1980s, the REIT industry has experienced a trend of property-type specialization to the point of unique sectors such as timber, prison, and golf course REITs.[73]

2.3.2 Regulatory Framework and Funds from Operation of REITs

Concept of FFO

Since REITs are active, constantly changing operating companies whose activities go beyond the acquisition and sale of properties, investors and analysts need an earnings measure that reflects the internal financing potential and net cash flow of REITs. Therefore, one unique feature of REITs in comparison to other stocks is the concept of FFO as an earnings measure. The rationale behind this concept is that GAAP net income is not a good indicator of REIT earnings because depreciation expenses under GAAP do not account for a considerable amount of the cash flow of a REIT, and depreciation does not match an actual loss in the nominal value of the actual property. Therefore, the REIT industry in the United States has adopted the concept of FFO (and AFFO) as an earnings measure.[74] NAREIT adopted the definition of FFO for U.S. REITs in 1992 to promote it as an industry-wide standard, and has amended and clarified it several times, in 1995, 1999, and 2002. The current definition is as follows:

Formula 1: Calculation Funds from Operations

GAAP Net Income
+ Gains (or losses) from sale of property
+ Depreciation and amortization
+ Adjustments for unconsolidated partnerships and joint ventures
= FFO

Source: NAREIT (2002).[75]

[73] Cf. DEWEESE, C. (2005); GOOLSBEE, A./MAYDEW, E. (2002), p. 441-42.

[74] Cf. GELTNER, D., et al. (2007), p. 593.

[75] Cf. NAREIT (2002), p. 2.

Since FFO does not aim to be a measure of dividend-paying capacities, other adjusted measures such as Funds Available for Distribution (FAD), Cash Available for Distribution (CAD), or Adjusted FFO (AFFO) have been developed. Although FFO alone cannot fulfill all requirements as an earnings proxy, it is a uniform, transparent measure and a cash flow/valuation metric.[76] Consequently, FFO is used as the preferred indicator for the earnings of a REIT in the context of this analysis. Similarly, Price/FFO multiples are used for the sake of determining "relative value" similar to the Profit/Earnings ratios of common stocks.

Regulatory Framework and Tax Constraints

REITs have a unique and strict regulatory framework that is advantageous for the analysis. Due to the extensive literature available on the regulatory framework and tax constraints of REITs, for example, NAREIT (2007a); BUENNING (2006), ZEW/EBS (2005), the section addresses only the most important aspects for the analysis.[77]

First, since 75% or more of a real estate investment trust's assets must be real estate, mortgages, and government securities cash, and more than 75% of the yearly gross income of a REIT must derived from real property ("Asset Test"),[78] the predominant proportion of the asset base is actually invested in real estate. Therefore, REITs are more likely to reflect the return characteristics of the underlying real estate assets only in contrast to other real estate investment vehicles that have a lower portion of their asset base in real estate. This is an important factor for the statistical significance of the analysis under consideration of the research aspect to assess the importance of the real estate assets.

Second, the "income test" requires that REITs must derive most of their income from passive sources such as rents and not from short-term trading or sale of property assets (>75%). Moreover, REITs cannot shield non-real-estate income from corporate taxation.[79] Therefore, REITs derive their income nearly exclusively from real estate.[80]

[76] Cf. YUNGMANN, G./TAUBE, D. (2001), p. 2.

[77] Cf. NAREIT (2007a), no page; BUENNING, M. (2006), p. 51-52; ZEW/EBS, O.-W. (2005), p. 8.

[78] Cf. GELTNER, D., et al. (2007), p. 587; NAREIT (2007a), no page.

[79] REITs are fully taxed on income from "prohibited transactions".

[80] Cf. MUELLER, G.R./ANIKEEFF, M.A. (2001) for a detailed description of the link between real estate ownership, rents, the operating business and the risk/ return characteristics of REITs.

Consequently, it is more likely that there is a causal relationship between the physical market cycle characteristics and the performance of REITs.

Third, the "distribution test," which requires that 90% of a REIT's taxable net income must be distributed to the shareholders as dividends, implies that REITs cannot retain a large portion of their income for future investments. Therefore, changes in the physical real estate market cycle in the private markets (for example, a drop in rent levels and increase in vacancies) directly affect the dividend-paying abilities of a REIT.

The regulatory framework of REITs has changed over time. One important amendment was the 1999 REIT Modernization Act ("RMA") – effective in 2001 – that had a significant impact on the investment strategies of REITs because it contained various provisions that extended the operating range of REITs. The aim of the RMA was to "allow REITs to compete on a more level playing field and carry out their business plans with greater efficiencies" with the aim to revitalize the REIT structure.[81] Since 1997, when the Taxpayer Relief Act (TRA) was enacted, a relatively small portion of non-customary services to the tenants was allowed. In the light of the evolution of customer-focused operating companies, the possibility of delivering extra services, such as a concierge service, contributed positively to the competitive edge of REITs. Although a paradox, REITs were even prohibited from providing certain "leading edge" services to their tenants before the enactment of the RMA. Taxable REIT Subsidiaries (TRS) were the key provision of RMA. TRAs provide a new revenue opportunity but also offer the ability to control the quality of the services delivered to the tenants and to create customer loyalty.

Taxable REIT subsidiaries are important for the investment strategy of REITs because these subsidiaries offer REITs the opportunity to provide their expertise to non-tenants in a structure that is fully taxable. Therefore, the government relaxed the "10% asset test" and allowed REITs to own sufficient voting stock to control their TRS.[82] Under the RMA, not more that 20% of a REIT's asset (at fair market value) must be securities. Additionally, REITs were allowed to own more than 5% of the assets of a single issuer.

[81] Cf. NAREIT (2008c), no page.

[82] Under these rules, a REIT may not own more than 10% of the voting securities of another company (other than a "qualified REIT subsidiary" or another REIT), and the securities of another company may not exceed 5% of the value of a REIT's total assets.

Nonetheless, the RMA prohibits a TRS from managing or operating lodging, resort, or healthcare facilities.

Consequently, Taxable REIT Subsidiaries have three essential advantages: The possibility of creating greater customer loyalty and increasing competitiveness, the formation of a new income stream for the REIT and its shareholders and the control of the quality levels delivered to tenants that imply the possibility of increasing rent levels. Additionally, the RMA decreased the distribution requirements of REITs from 95% to 90%. The ability to retain a certain proportion of the income is an important factor for REITs. Since REITs operate in a capital-intensive industry, they have to incur capital expenditures to keep or increase the marketability of their properties or to make repayments on outstanding debt. Altogether, the RMA contributed significantly to the development of REITs in fully-integrated operating companies.

2.3.3 Classification of Real Estate Investment Trust Property Sectors

Having described the physical market cycle, this section defines and delineates the REIT sectors based on property types that are subject of the analysis. Since REIT sector denominations are used in different contexts and can include different property subsectors, the important characteristics on a property level that must be understood are defined for office , industrial, retail, hotel, and Apartment REITs. For example, the term “Residential REITs” can include Apartment REITs as well as Manufactured Housing REITs. Since the empirical analysis investigates the importance of the underlying real estate assets for the performance of REITs, it is important to classify property types exactly and REIT sectors accordingly.

Apartment, Multifamily, Manufactured Housing, Residential

Due to the different terms referring to REITs that invest in residential real estate, a precise classification and a term designation are necessary. Most important, this dissertation focuses on income-producing real estate only. Therefore, a company that is active in residential *for sale, not for rent* home ownership markets cannot be a REIT. Residential (for sale) home ownership markets are a production process, where

inventory is used to manufacture a product that is sold to customers.[83] This concept is completely different for a REIT, which acquires/sells and manages income-producing apartment buildings. Consequently, real estate cycles are different between these two sectors, driven by different fundamentals. For example, a large share of borrowers, by virtue of poor credit history, unstable income, and other characteristics, would not have been able to qualify for a mortgage without the subprime lender market. This is different from commercial real estate, where the insolvency risk depends on the credibility of (multiple) tenants in a building.[84]

Due to the lack of data and the minor importance of Manufactured Housing REITs (MH-REITs) that own land and rent it to the owners of mobile homes, this group of REITs is excluded from the sample. For example, Equity LifeStyle Properties, Inc. (ELS) owns and operates the highest-quality portfolio of resort communities in the United States. The company has a controlling interest in more than 300 quality resorts in 28 states and British Columbia, with more than 110,000 sites.[85] Nonetheless, these companies are different from Apartment REITs that own and manage rental units.

Apartment REITs invest in multiple separate housing units that are contained within one building. The most common form is an apartment building but could also be a four-plex. Also, planned communities incorporate apartment residences, such as in co-op housing projects. A building must have at least four or five units to be classified as an apartment building.[86]

Since apartment properties constitute about 25% of the total commercial real estate market in the United States, Apartment REITs make up one of the most important REIT sectors. With the exception of niche apartment communities, apartment properties provide a relatively stable income stream, and their capital requirements are easy to forecast. In general, apartment properties are classified by investors according to quality rating (A, B, or C) and size and layout (high-, mid-, and low-rise). The most important drivers of the physical market cycle (supply and demand) are demographic trends, employment, and economic growth (in addition to changing consumer preferences and tax laws). The main competition for rental apartments is home ownership. In contrast to

[83] Cf. MUELLER, G.R. (2006), p. 4.

[84] Cf. CHINLOY, P./MACDONALD, N. (2005), p. 153 et seq.

[85] Cf. ELS (2008), no page.

[86] Cf. PPR (2007a), no page; SNL (2007b), no page.

Office, Retail, and Industrial REITs, the common measurement used to describe apartment properties is "per unit."[87]

In addition, the term "Apartment REITs" (AP-REITs) is more precise in the way that it refers only to multiple housing units, in comparison to the term "Multifamily REITs" (MF-REITs), which includes Manufactured Housing REITs (mobile homes). Apartment REIT is the preferred term used in this analysis. Consequently, AP-REITs − in the context of this analysis − are defined as REITs that invest in income-producing multiunit residential properties excluding Manufactured Housing REITs.

Warehousing, Industrial, Distribution, Logistics

Within the scope of this analysis, the term "Industrial REITs" (IN-REITs) is used to describe REITs that invest and manage warehouses and distribution centers. It excludes self-storage facilities, which are summarized in a different sector category. Depending on the function, for example, storage, distribution, or processing, industrial properties can differ significantly in their structure and fungibility.

Moreover, industrial properties are driven by different fundamentals and trends. Their performance and physical market cycle depend heavily on the development of the trucking and distribution industry, which was influenced by major shifts in the last decade.[88] Industrial REITs normally lease industrial space to manufacturers, retailers, transportation companies, third-party logistics providers, and other enterprises with large-scale distribution needs. In contrast to industrial developers that had been transaction-focused rather than service-oriented, companies such as ProLogis have embraced a different approach, seeking to become valued business partners for their customers in an era of change in manufacturing and distribution, for example, in the emerging Asian markets. Industrial REITs such as ProLogis follow their customers into new markets to extend their asset base.[89] Consequently, the Industrial REITs that are covered invest in rental warehouse properties and other types of rental industrial properties.

[87] Cf. POORVU, W.J./CRUIKSHANK, J.L. (2000), p. 260.

[88] Cf. MUELLER, G.R./MUELLER, A.G. (2007); MUELLER, G.R./LAPOSA, S.P. (1994a), p. 42-43.

[89] Cf. PROLOGIS (2007b), no page.

Shopping Centers, Regional Malls, Outlet and Power Centers, and Single Tenant

Different REIT property subtypes are subsumed in Retail REITs (RE-REITs). On a property focus level, it can be differentiated between three main categories: Shopping Center REITs, Regional Malls REITs, and Other Retail REITs. Generally, regional malls are shopping malls that are designed to service a larger market than a "conventional" shopping mall. Consequently, these malls typically have more than one anchor tenant and offer a variety of shops and stores. Normally, this also includes higher-end stores, and regional malls can often be found as tourist attractions in vacation areas. An outlet mall is a special type of shopping mall where manufacturers sell their products directly to the public through their own branded stores or sell returned goods and discontinued products, often at heavily reduced prices. Shopping Center REITs are usually in neighborhoods with a grocery anchor tenant and other small convenience merchants.

Two of the most prominent Shopping Center REITs are the Developer Diversified Realty Corporation and the Kimco Realty Corporation.[90] Two of the largest regional malls REITs are General Growth Properties and Simon Properties.[91] REITs that belong to the category Other Retail REITs could be companies such as National Retail Properties, which acquires and owns single-tenant net lease retail properties, or Tanger Factory Outlet Centers Inc., which invests exclusively in factory outlets.[92] Within the scope of this study, the term Retail REITs refers to all types of Retail REITs. Otherwise, the respective subsector denominations Shopping Center REITs (SH-REITs), Regional Malls REITs (RM-REITs), or Other Retail REITs (OR-REITs) are used. The term designation presented above is the basis for the classification of REITs in the analysis.

Hotel, Lodging, and Resort REITs

Hotel properties constitute between 10% and 12% of all commercial real estate and are often referred to as the "fifth food group."[93] REITs that invest in all types of lodging or resort properties are referred to as Hotel REITs (HO-REITs) in the context of this study.

[90] Cf. KIMCO (2008), no page; DDR (2008), no page; SNL (2007b), no page; HEATH, T. (1998), p. 20.

[91] Cf. GGP (2008), no page; SPG (2008), no page.

[92] Cf. NAREIT (2007a), no page; SKT (2007), no page.

[93] Cf. CORGEL, J.B. (2005), p. 91; HESS, R.C./LIANG, Y./MCALLISTER, R. (2001), p. 51-52; LARKIN, D. (2006), p. 23.

Hotel REITs can differ significantly regarding geography and assets types. While most HO-REITs such as Host Hotel & Resorts Inc. or LaSalle Hotel Properties invest in full-service hotel properties, some HO-REITs such as the Hersha Hospitality Trust or Supertel Hospitality Inc. specialize in limited-service hotel properties.[94] Furthermore, Hotel REITs such as the Innkeepers USA Trust focus on extended-stay hotel properties. It is important to note that the REIT Modernization Act – effective from January 1, 2001 – prohibits a Taxable REIT Subsidiary from managing and operating lodging, resort, or healthcare facilities. Hotel properties have often been excluded from "traditional" real estate sectors because they differ from typical real estate investment criteria in some ways. For example, hotel properties are often highly leveraged operationally because of their high maintenance and staffing needs. Moreover, the volatility of the lodging industry reflected in unsteady income streams even for high-profile city locations with established brand names. These factors have kept some real estate investors away from Hotel REITs.

Office Real Estate

Office REITs do not have a major set of subcategories even though there are downtown and suburban properties as well as class "A," "B," and "C" properties. For example, WHEATON/TORTO/EVANS (1997) showed the different dynamics of office submarkets for the greater London area.[95] Also, STEVENSON/MCGARTH (2003) showed the implications of the different dynamics of local submarkets for the forecasting of rents. These findings were confirmed by their analysis of intra-metropolitan dynamics of the London office market in 2007.[96] Therefore, office real estate is probably the most standardized property type of the five property types subject to this analysis.

Other REITs sectors such as Self-storage, Healthcare, Diversified or Specialty REITs are not described in further detail because they are not part of the empirical analysis. As shown in chapter 2.4.1, these sectors only constitute around 25% of the Equity REIT spectrum in the United States with Diversified (7%) and Healthcare (8%) REITs being

[94] Cf. SNL (2007b), no page.

[95] Cf. WHEATON, W.C./TORTO, R.G./EVANS, P. (1997), p. 77 et seqq.

[96] Cf. STEVENSON, S. (2007), p. 94-95.

the two largest REIT property type sectors excluded.[97] Since there is no coherent classification of REIT sectors and companies by risk classes e.g. “core” or “core plus”, this aspect is not factored as an independent variable.

[97] Refer to chapter 2.4.1 that is based on NAREIT data.

3 Analysis

3.1 State of Research and Hypotheses

Introduction

The literature review relates the research objective of the dissertation to previous studies and places it in a historical perspective. Also, the review critically analyzes areas of controversy and aims to identify areas that need further research. Consequently, the aim of this section is to specify the hypotheses that are tested in the analysis and adopted or rejected accordingly. The null hypothesis (H_0) is to be rejected to support the alternate hypothesis. If the null hypothesis is refuted, the alternate hypothesis (or maintained) hypothesis denoted as H_A is supported. This means that the restriction or set of restrictions to be tested does not hold, which implies that there is evidence for the alternate hypothesis.[98]

Due to the characteristics of real estate, evaluating the role of the underlying assets for the performance of Equity REITs is difficult. REITs invest in different property types that are driven by diverse macroeconomic factors in different regional markets, which are influenced by varying local, regional, and national parameters. In addition, REITs invest, manage, and sell properties in a multitude of space markets at a different point in the physical markets cycle. Therefore, bringing together property-type-related factors, metro-related factors, and physical market cycle aspects for the case of REITs is a complex underpinning.

As a consequence, the overall structure of the review depends on the research topic and groups together, compares, and contrasts the varying opinions on certain REIT sectors and topics. Consequently, the review is structured by topic areas, discussing the varying approaches and theories, and links them to the purpose of the study. The literature review – and the corresponding studies – is divided into the following sections:

State of Research regarding the Performance of REITs

- The role of real estate cycles
- The importance of property type
- The effect of economic/geographic diversification

[98] Cf.Ibid., p. 40-42; ECONTERMS (2008), no page.

Characteristics of REIT Property Type Sectors

- Industrial REITs
- Retail REITs
- Hotel REITs
- Apartment REITs
- Office REITs

The aim of the literature review is to compare and contrast different studies on the performance of REITs (sectors), the importance of the real estate portfolio, and the role of the physical market cycle to explain REIT returns. The purpose of the review is limited to the importance of the underlying assets for REIT performance and does not take into account the effect of the capital structure, for example.

The "Generalized Full Variable" hypotheses (null and alternate hypothesis) illustrate the overall thesis statement, which is that space markets cycles are important for the "income component" and the "capital appreciation" of REITs that form the total return of a REIT. The generalized full-variable hypothesis is a summary and simplification of the more detailed hypotheses.

Failing to reject the null hypothesis means that REIT performance is not primarily determined by space market fundamentals but by other factors, for example, by an overall stock market factor. Thus, an investment in REIT (sectors) should not primarily be based on factors that are tied to the underlying real estate assets. Consequently, investments in REITs should be based on other factors such as the general economic situation or other economic variables that might be able to explain the performance of REITs.

Generalized Full-variable Hypothesis

[H_A] "Space market cycles have a significant predictive power to explain the performance of REITs."

If there is evidence supporting the alternative hypothesis H_A, investors could make better investment decisions by analyzing market cycle information for the respective property types and markets a REIT is invested in. As a consequence, market cycle data should be included in the evaluation of real estate investment trust performance.

Based on the research questions, the research hypotheses present the testable statements of opinion that are subject to the analysis. Since it is not possible to test a hypothesis directly, the hypotheses need to be turned into null hypotheses that need to be refuted. This means that all statistical testing is carried out on the null hypothesis. Consequently, the statistical analysis will either reject or fail to reject the null hypothesis (accepting the null hypothesis would mean that there is not enough evidence to claim that the null hypothesis is incorrect).

To evaluate hypotheses, the dissertation follows a hypothetic-deductive method that demands falsifiable hypotheses, framed in a way that they can be proved false by the scientific community analyzing REITs. According to SCHICK/VAUGHN (2002), researchers should weigh up alternative hypotheses and take the following into consideration:

- Testability (compare refutability as discussed above),
- Simplicity (discouraging the postulation of excessive numbers of entities),
- Scope (the apparent application of the hypothesis to multiple cases of phenomena),
- Fruitfulness (the prospect that a hypothesis may explain further phenomena in the future), and
- Conservatism (the degree of "fit" with existing recognized knowledge systems).[99]

Due to the complexity of the analysis and the multiple variables involved, the generalized hypothesis can be further specified into the following hypotheses that are specified at the end of every sub-section and based on the research questions. For reasons of clarity, the following statements reflect only the hypotheses, not the null hypotheses that need to be disproved.[100] The (null) hypotheses are then tested for REIT sectors and company in order to refute H_0. Since the analysis has different types of research questions, the hypotheses are in three areas:

- Real estate investment strategies and space market cycles of REITs,

[99] Cf. SCHICK, T./VAUGHN, L. (2002), no page; SCHICK, T./VAUGHN, L. (2002), p. 77.

[100] A null hypothesis (abbreviated H_0) is a hypothesis to be disproved. The hypotheses above can be turned into a working null hypothesis simply by adding the word “not”.

- Signaling function of space market and earnings factors for REIT performance,[101]
- Predictive power of rent, occupancy, and FFO for the pricing of REITs.

3.1.1 Importance of Real Estate Cycles for Real Estate Investment Trusts

The role of real estate cycles has been investigated by various researchers, for example, MALPEZZI/WACHTER (2005); WERNECKE/ROTTKE/HOLZMANN (2004); PYHRR et al. (2003); MUELLER (2002); MUELLER (1999); PYHRR/ROULAC/BORN (1999); WHEATON (1999); PENG/CHANG/LIN (1998); KAISER (1997); CHINLOY (1996); MUELLER/PAULEY (1995); MUELLER (1993); BROWN (1984).[102]

In addition, the role of real estate cycles in conjunction with real estate securities has been analyzed by various researchers in different contexts, e.g., HARTZELL/KALLBERG/LIU (2005); MUELLER/PAULEY (1995); SAGALYN (1990). While HARTZELL/KALLBERG/LIU (2005) analyzed the role of the underlying real estate portfolio and market cycles for REIT IPOs,[103] SAGALYN (1990) looked at the role of business cycles and property risk for real estate securities. The study by SAGALYN (1990) revealed that systematic risk and risk-adjusted returns of REITs are quite different, especially during periods of low growth.[104] The work of MUELLER/PAULEY (1995) suggests that the change in performance of real estate comes from a complex relationship of supply and demand that affects occupancy and rents as well as from capital flows. Moreover, their study demonstrated that changes in interest rates cannot adequately explain REIT performance.[105]

Most recently, the importance of real estate cycles has been investigated by LEE/DEVANEY (2007); EVANS (2007); EDELSTEIN/TSANG (2007). Nonetheless, the focus and scope were different. Edelstein and Tsang's (2007) study developed a dynamic

[101] Or vice versa the reaction rate of REIT performance to changes in the underlying space markets or operating performance.

[102] Cf. MALPEZZI, S./WACHTER, S.M. (2005); WERNECKE, M./ROTTKE, N./HOLZMANN, C. (2004); PYHRR, S.A., et al. (2003); MUELLER, G.R. (2002); MUELLER, G.R. (1999); PYHRR, S.A./ROULAC, S.E./BORN, W.L. (1999); WHEATON, W.C. (1999); KAISER, R.W. (1997); CHINLOY, P. (1996); MUELLER, G.R./PAULEY, K.R. (1995); MUELLER, G.R. (1993); BROWN, G.T. (1984).

[103] Cf. HARTZELL, J.C./KALLBERG, J.G./LIU, C.H. (2005), p. 47-48.

[104] Cf. SAGALYN, L.B. (1990), p. 203.

[105] Cf. MUELLER, G.R. (1995), p. 47-48.

model to illustrate residential for sale cycles. The researchers found that local fundamentals are more important than regional and national factors in order to explain housing cycles.[106] Referring to the period from 1987 to 2002, the paper by Lee and Devaney (2007) found that the importance of property sector and regional factors is not constant over time. In this context, the researchers concluded that property-type factors dominate regional (geographic, not metro-area) factors for the majority of the time. Nonetheless, the researchers confirmed that during calmer periods property type and regional factors are of equal importance.[107]

Analyzing the investment performance benefits of timing real estate cycles, the study by COOPER/DOWNS/PATTERSON (1999) assessed the benefits derived from short-term real estate cycles, in particular through publicly traded real estate securities. The researchers concluded that REIT markets nowadays are sufficiently liquid to beneficially execute short-term trading strategies. The researchers offered the idiosyncratic nature of real estate cash flows as an explanation for the success of an investment strategy that targets short-term real estate cycles.[108]

Referring to the work of COOPER/DOWNS/PATTERSON (1999), the study by DERMISI (2007) examined the role of terrorism fears as one possible external effect on short-term property market cycles. Her study showed that building classes in conjunction with office market cycles are affected differently by terrorism fears. While "trophy buildings" were severely impacted, "Class A" buildings were less impacted, and "Class B" buildings experienced even less impact. Although the role of real estate cycles in general as well as with regard to certain aspects has been dealt with by various scholars, no detailed and consistent study exists that analyzes the role of real estate market cycles for real estate investment trusts.

Furthermore, different researchers have analyzed the role of real estate cycles for the case of Europe, for example, NEWELL et al. (2004); WERNECKE/ROTTKE/HOLZMANN (2004); BOND/PATEL (2003); ROTTKE/WERNECKE/SCHWARTZ (2003); HARRIS (2001); BAUM (1999); RENAUD (1999).[109] One of the first analyzing the role of real estate cycles

[106] Cf. EDELSTEIN, R./TSANG, D. (2007), p. 463.

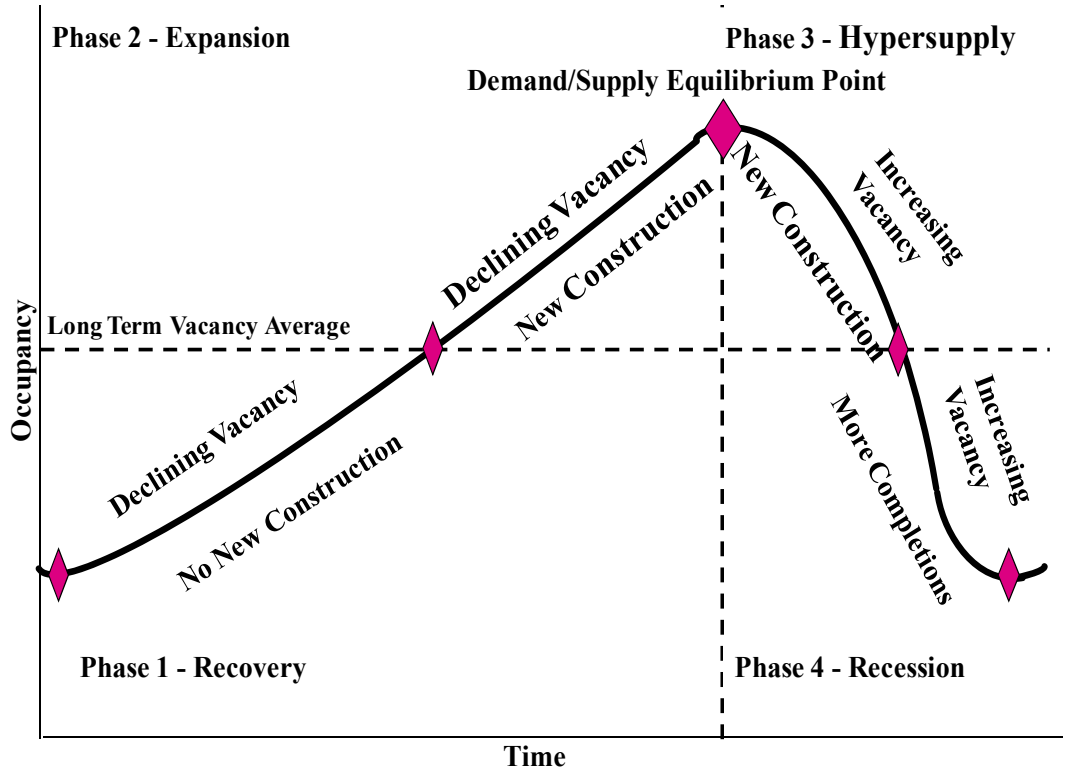
[107] Cf LEE, S./DEVANEY, S. (2007), p. 67.

[108] Cf. COOPER, M./DOWNS, D.H./PATTERSON, G.A. (1999), p. 330.

[109] Cf. NEWELL, G., et al. (2004); WERNECKE, M./ROTTKE, N./HOLZMANN, C. (2004); BOND, S.A./PATEL, K. (2003); ROTTKE, N./WERNECKE, M./SCHWARTZ, A.L., JR. (2003); HARRIS, J. (2001); BAUM, A. (1999); RENAUD, B.M. (1999).

for international property was BAUM (1999), who found that real estate cycles can clearly be found for the U.K. and Europe, especially in construction/development and in rental markets. The author projected that property cycles may be smoother in the future due to an increased efficiency and transparency of European markets.[110] Similarly, RENAUD (1999); RENAUD (1997) in his analysis for the period of 1985 to 1994 found clear real estate cycles caused by international factors, especially capital inflows through Japanese foreign direct investment, and domestic factors such as financial deregulation within the European Union and careless lending by financial institutions.[111] WERNECKE/ROTTKE/HOLZMANN (2004); ROTTKE/WERNECKE/SCHWARTZ (2003) analyzed and quantified real estate cycles in Germany and found that research in the Anglo-American literature "do[es] not necessarily need to be applicable to management in Germany."[112]

Figure 13: Market Cycle Quadrants



Source: MUELLER (1999), p. 134.

[110] Cf. BAUM, A. (1999), p. 11.

[111] Cf. RENAUD, B.M. (1999); RENAUD, B. (1997), p. 37-38.

[112] Cf. WERNECKE, M./ROTTKE, N./HOLZMANN, C. (2004); ROTTKE, N./WERNECKE, M./SCHWARTZ, A.L., JR. (2003), p. 342-43.

In the context of this study, the analysis of real estate cycles and the application to REIT sectors refers to the research of market cycles from MUELLER/MUELLER (2003); MUELLER (2002); MUELLER (1999); TESSIER/MUELLER (1999); MUELLER (1995); MUELLER/LAPOSA (1994b); MUELLER/LAPOSA (1994c); MUELLER/LAPOSA (1994d); WURTZEBACH/MUELLER/MACHI (1991) and PYHRR/ROULAC/BORN (1999); PYHRRN/ROULAC/BORN (1999); PYHRR/BORN/WEBB (1990); PYHRR et al. (1990).[113] MUELLER (1999) developed a rental growth rate hypothesis based on a market's position in the physical market cycle based on data for 54 office and industrial markets over a 30-year period. Figure 13 depicts the physical market cycle as an occupancy cycle with four different phases based on the change in supply and demand. Mueller also calculated a long-term average occupancy (LTAO) as the historic midpoint in the cycle. It is important to note that the LTAO level is different for different markets as well as property types.[114]

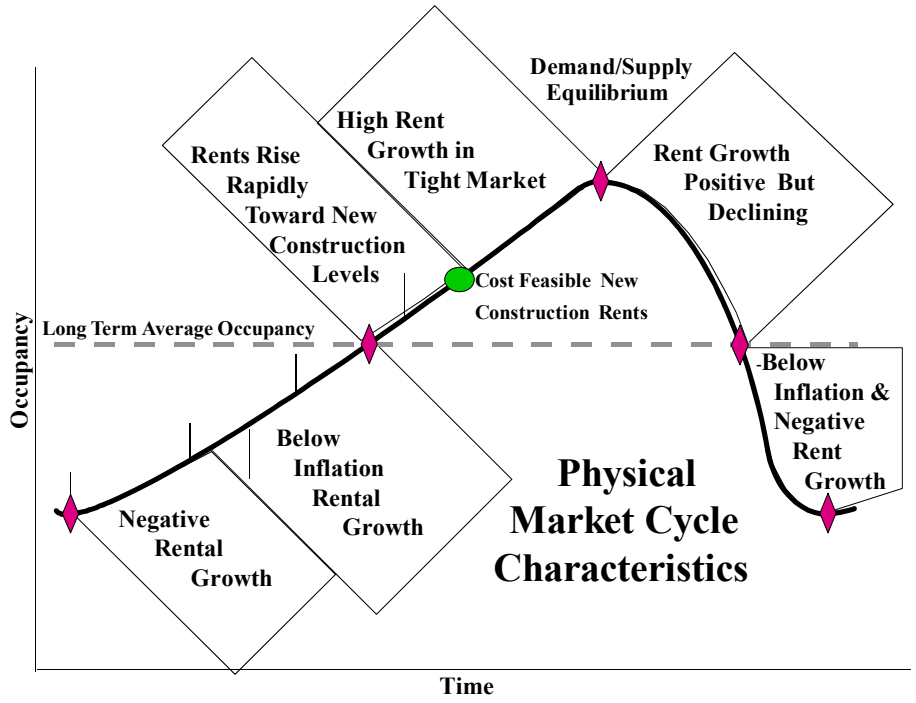
In Figure 14, MUELLER (1999) describes the characteristics of demand, supply, and rent growth during the physical market cycles and identifies different important points in the market cycle. At the beginning of phase 1, the market faces an oversupply of space, occupancy is at its lowest level, and rents decline. At the beginning of phase 2, when occupancy levels are above the LTAO, rents begin to rise rapidly, which allows profitable new construction. At the demand/supply equilibrium, demand and supply are the same, and occupancy levels reach their peak. After the demand/supply equilibrium, supply growth rates exceed demand growth rates, but some market participants do not recognize this turning point because rental growth rates are still above the LTAO even though occupancy rates are decreasing sharply. The fourth phase – the recession phase – begins when occupancy levels are below LTAO, causing rent growth to be low or negative.

MUELLER (1999) identified 16 points in the physical market cycle for each individual market with an average occupancy and rental growth rate, based on the historic market data. Also, Mueller found that market rental growth rates were not tightly clustered around the national average.

[113] Cf. NELSON, T.R./NELSON, S.L. (2003); MUELLER, G.R. (2002); PYHRR, S.A./ROULAC, S.E./BORN, W.L. (1999); MUELLER, G.R. (1999); MUELLER, G.R. (1995); MUELLER, G.R./LAPOSA, S.P. (1994d); MUELLER, G.R./LAPOSA, S.P. (1994c); MUELLER, G.R./LAPOSA, S.P. (1994b); PYHRR, S.A./BORN, W.L./WEBB, J.R. (1990).

[114] Cf. MUELLER, G.R. (1999), p. 134-35.

Figure 14: Physical Market Cycle Characteristics



Source: MUELLER (1999), p. 136.

Also, the work of PYHRR et al. (2003); PYHRR/ROULAC/BORN (1999); PYHRR/BORN/WEBB (1990) has demonstrated the benefits for investors to include market cycles in their investment decisions and cash flow projections. The scholars' research stresses the importance of market research to understand the economic factors and cycles that affect returns and valuations. The authors also developed a whole real estate cycle research framework and classification framework for project and portfolio management.[115] PAYNE/ZUEHLKE (2006) even provided positive evidence of positive duration dependence, hence an ability to predict turning points of a cycle.[116] Moreover, WANG (2003) combined real estate and common cycles and holds the view that property cycles fit into the business cycle well and have long-run co-movement with most parts in the economy.[117] The findings imply that the prediction of property cycles can be improved by analyzing cycles in other sectors.

Thus, executing a joint analysis offers benefits for real estate investment decisions and triggers the necessity of an integrated analysis. Overall, the literature regarding real

[115] Cf. PYHRR, S.A., et al. (2003); PYHRR, S.A./ROULAC, S.E./BORN, W.L. (1999); PYHRR, S.A./BORN, W.L./WEBB, J.R. (1990), p. 191.

[116] Cf. PAYNE, J.E./ZUEHLKE, T.W. (2006), p. 420.

[117] Cf. WANG, P. (2003), p. 340.

estate markets stresses the need for individual market to be modeled differently in the context of this study. To summarize, the previous studies show:

1) Real estate cycles are an important determinant of property performance,
2) The complex relationship between supply and demand affects occupancy rates and rent levels, and can best be measured by occupancy rates and rents for individual metro areas,
3) Property types are affected differently by macroeconomic and demographic factors, the business cycle, and geographic factors,
4) Findings regarding the effect of real estate cycles on the performance of REIT sectors are inconclusive,

which leads to the following hypothesis:

[H1] Space Market Cycle Outperformance of REITs

"Rent and occupancy levels of REITs are higher than the overall market by space market selection and timing."

This implies that REITs have successfully targeted (on an aggregated sector level) metro areas with higher rental growth rates and occupancy levels. Also, "outperformance" in this case can arise only from the management's ability to invest in markets that perform above average and divest in markets that are underperforming the national average. Taking into consideration the long time frame of the analysis and the large number of properties, this seems to be relatively difficult. In this way, the outperformance can arise only from superior market timing and selection abilities.

[H2] Relationship between Occupancy and Rents

"There are significant, positive links and time lags between occupancy and rent levels of REITs."

[H3] Relationship between Growth Rates and Levels of Rent and Occupancy

"Rental and occupancy growth rates are an earlier indicator of changing space market conditions than rent and occupancy levels."

3.1.2 The Role of Property Type and Metro-area Factors for Real Estate Investment Trusts

The role of property type and geographic diversification for the performance of real estate stocks has been analyzed by various researchers, most recently by PING/ROULAC (2007); LEE/DEVANEY (2007); YOUNG/LEE/DEVANEY (2006); HESS/LIANG (2006); BREIDENBACH/MUELLER/SCHULTE (2006); STEPHEN/SIMON (2005); NICHOLS/BOUTELL (2005); HAMELINK/HOESLI (2004).[118] To reiterate, different strands of opinion exist in the literature on the effect of property-type and regional diversification. While one strand of literature finds that property-type factors are more important, other scholars find that regional factors are more important. In summary, findings regarding the importance of location and property-type composition of REITs on performance diverge highly in the academic discussion. Moreover, the various studies differ significantly regarding the study period, focus on one parameter only, or remain on an aggregate level.

Property Type Specialization

Exploring the link between property type and stock performance, ANDERSON et al. (2005) study of U.S. REITs indicates that a direct relationship exists between property-type diversification and the traditional market-based measures of return. Their analysis focused on the period from 1997 to 2002 and included 73 to 79 REITs, depending on the respective year. However, their results did not provide explicit evidence of the direction of that influence.[119] For the case of Australian LPTs, LEE (2003) found that outperformance is more likely for sector-specific LPTs rather than diversified LPTs. Also, Lee's analysis showed that although LPT managers were not able to outperform a passive buy-and-hold strategy by market timing, they could improve their performance

[118] Cf. PING, C./ROULAC, S.E. (2007); LEE, S./STEVENSON, S. (2007); YOUNG, M.S./LEE, S.L./DEVANEY, S.P. (2006); HESS, R./LIANG, Y. (2006); BREIDENBACH, M./MUELLER, G.R./SCHULTE, K.-W. (2006); STEPHEN, L./SIMON, S. (2006); NICHOLS, M./BOUTELL, M. (2005); HAMELINK, F./HOESLI, M. (2004).

[119] Cf. ANDERSON, R., et al. (2005), p. 20-22.

through superior selection ability. Overall, the results favor the evidence of managers obtaining superior risk-adjusted performance.[120]

Likewise, in an investigation of investment styles and style boxes in equity real estate, KAISER (2005) showed that diversification can affect style. He found that the higher the number of non-core property assets in a portfolio and the lower the number of properties, the more a portfolio is likely to be characterized as value-added. And vice versa: the lower the number of non-core assets and the higher the number of properties, the higher the likelihood a portfolio can be characterized as "core."[121]

Extending the analysis to international real estate stocks, BOER/BROUNEN/OPT VELD (2005) used 17 years of data for international listed property markets. Their results show distinctive differences between the continental sample and the U.S. equity REITs. Whereas U.S. REITs focus primarily on property type, European property stocks tend to focus on one geographic region. The analysis reveals that there has been a clear shift to sector specialization in the U.S. They conclude that specialized companies are more likely to outperform their competitors but have a higher firm-specific risk.[122]

Analyzing the performance of REIT sectors, the study conducted by CAPOZZA/LEE (1995) documented that diversified and small REITs have expense ratios that are above average. Regarding geographic focus, Apartment REITs showed the highest concentration. Also, the small REITs in the sample were on average more focused by property type. Moreover, the study showed that REIT sectors traded at significantly different premiums above the values of their underlying properties.[123] Similarly, HAMELINK/HOESLI (2004) found in their analysis of international real estate returns during the period from 1990 to 2003 that country and property type are the dominant factors for portfolio construction. Nonetheless, the researcher also found that other factors such as size, the cluster factor, or the value/growth ratio are important investment factors in real estate securities analysis. HAMELINK/HOESLI (2004) investigated factors that drive international real estate returns and found that country factors dominate property factors. Furthermore, the authors showed that the value/growth factor even plays a more important role when diversification is conducted

[120] Cf. LEE, S.N., GRAHAM; STEVENSON, SIMON (2003), p. 5.

[121] Cf. KAISER, R.W. (2005), p. 13.

[122] Cf. BOER, D./BROUNEN, D./OPT VELD, H. (2005), p. 263-266.

[123] Cf. CAPOZZA, D.R./LEE, S. (1995), p. 378.

across continents, not countries. The analysis conducted focused on continental factors, property type, size, and a value/growth factor.[124]

Examining the performance of and correlation among different REIT sectors, EICHHOLTZ/OP T VELD/SCHWEITZER (1997) looked at the period from 1990 (56 equity REITs) to 1996 (161 equity REITs) and the effect of property-type specialization on outperformance. They found that companies that focus on a specific property type outperform the market, whereby geographic focus leads to underperformance.[125] Consequently, investors should invest in REIT stocks that invest in only one property type but are geographically diversified.

Moreover, a research report from the CMCH (2002) (Canadian Mortgage and Housing Corporation) found that the underperformance of Canadian REITs is partly due to the inability to position clearly specialized REITs regarding property type. Although Canadian REITs tend to specialize more and more, there may "not be enough properties attractive to Canadian REITs in a specialized asset class" in order to justify an increased degree of focus. The report also stated that the inability to delineate risk along specific property-type lines is one important reason for the underperformance of Canadian REITs.[126]

The study conducted by YOUNG (2000) arrived at the conclusion that REITs categorized by property type have become more integrated, though showing a lower correlation between pairs of property-type grouped REITs. These findings imply that investors are less likely to earn excess profits by allocating investments to one type of REITs.[127] This refers only to the finding that sectors have become more integrated and does not mean that the correlations among individual securities within a sector have increased.

In contrast, referring to the analysis of MYER/WEBB (2000), the scholars found evidence that property-type allocation has the ability to explain REIT stock performance. In their analysis, they looked at 10 REITs and nine mutual funds for the period 1994 to 1996

[124] Cf. HAMELINK, F./HOESLI, M. (2004)., p. 13.

[125] Cf. EICHHOLTZ, P./OP T VELD, H./SCHWEITZER, M. (1997), p. 8-9.

[126] Cf. CMCH (2002), p, 25.

[127] Cf. YOUNG, M.S. (2000), p. 19.

and concluded that property-type selection is useful in the explanation of REIT outperformance.[128]

Taking a different performance measure, SING/LING (2003) used a downside risk asset allocation framework to assess the diversification benefits of different property types in their investigation of Singapore REITs (S-REITs). The authors showed that all sectors displayed low correlations with stocks and bonds. Moreover, Sing and Ling's results indicated that office and industrial property trusts exhibited higher risk-adjusted returns and lower correlation coefficients in comparison to diversified REITs.[129] Likewise, KENG (2004) found that the low correlation of property types, for the case of Australia, implies the existence of significant diversification benefits. In the examination of 23 Australian property securities over a five-year period, starting in 2002, implied property-type allocation explained more than 80% of variations in performance.[130]

Investigating the benefits of diversification for the U.K., LEE/DEVANEY (2007); LEE (2005); LEE/STEVENSON (2005b) analyzed the relative performance of sector and regional factors.[131] LEE/DEVANEY (2007) found that the property type is generally of greater importance, especially during volatile periods of the real estate life cycle for the case of property in the U.K.[132] Similarly, LEE/STEVENSON (2005b) analyzed the question whether it is beneficial to diversify a portfolio within a property type across regions or vice versa, extending out of a London-based portfolio. The authors found that staying within London and diversifying across property types has a similar effect as regional diversification, similar to the study by BYRNE/LEE (2000). Overall, their research suggests that property-type factors are more important than regional factors.[133]

Analyzing trends and strategies of REITs and Real Estate Operating Companies (REOCs), HESS/LIANG (2003b) summarized REITs that increase their focus on niche markets and redefine or sharpen their strategies. The reason, therefore, is the lack of buying opportunities that resulted in little incentive to companies to issue new stock. Furthermore, the scholars demonstrate how REITs and REOCs have shifted their

[128] Cf. MYER, F.C.N./WEBB, J.R. (2000), p. 339.

[129] Cf. SING, T.F./LING, S.C. (2003), p. 9.

[130] Cf. KENG, T.Y. (2004), p. xxiv.

[131] Cf. LEE, S./DEVANEY, S. (2007); LEE, S.L. (2005), p. 408 et seqq., LEE, S./STEVENSON, S. (2005b), p. 394 et seq.

[132] Cf. LEE, S./DEVANEY, S. (2007), p. 67.

[133] Cf. LEE, S./STEVENSON, S. (2005b), p.394; BYRNE, P./LEE, S. (2000), p. 35.

strategies in an operating environment, which is visible by the amount and extent of joint ventures (JVs).[134]

CAMPBELL/WHITE-HUCKINS/SIRMANS (2006) showed that JVs provide a way especially for diversified REITs to partner up with specialized managers. Since interests are aligned in a JV where both parties have an equity stake, possible negative implications of diversification can be mitigated. As a consequence, markets – in general – respond positively to the announcement of a JV. The analysis of REIT joint ventures also included property development projects. For this case, the authors find that about 60% of all acquisitional JVs are development projects with financial partners. Moreover, another 15% are JVs with development companies. The reasons, therefore, are that JVs provide a way to protect the balance sheet of a REIT and the income statement from short-term negative effects. Additionally, the JV structure implies the possibility of scheduling the dissolution of the JV entity and the consolidation of the assets. Also, the JV structure is a low-cost and well-defined exit option in case the project fails.[135]

Extending the relationship between stock performance and firm activity from property type and geographic specialization to property development, BROUNEN/EICHHOLTZ (2004) found a positive and significant relationship between development involvement and firm performance, the same as for the degree of risk. Notably, the systematic risk of property companies appears to increase with the weight of the development activities.[136] Consequently, companies with a high proportion of development provide above-average profitability during economic booms and low profitability during soft markets.

Effectiveness of Economic and Geographic Diversification Strategies

Different researchers, for example, LEE/STEVENSON (2005b); MUELLER/ZIERING (1992); HARTZELL/SHULMAN/WURTZEBACH (1987), have investigated the benefits of different regional diversification strategies, using different approaches to segment regions either

[134] Cf. HESS, R./LIANG, Y. (2003b), p. 3.

[135] Cf. CAMPBELL, R./WHITE-HUCKINS, N./SIRMANS, C. (2006), p. 287.

[136] Cf. BROUNEN, D./EICHHOLTZ, P. (2004), p. 20-21.

based on the underlying economic activity, across country, state, city, or submarket boundaries or a combination of economics and geography.[137]

One of the first studies, conducted by HARTZELL/SHULMAN/WURTZEBACH (1987), showed that diversifying across regional boundaries does matter. Also, the authors showed the benefits of extending regional diversification from four regions – the East, West, Midwest, and South – to eight regions based on underlying economic fundamentals. On the other hand, the authors questioned the possibility of property-type diversification benefits within one of the traditional four regions.[138]

Extending the research on economic diversification by applying the Prudential Portfolio Construction Process that places MSAs into DECs (finance/service, manufacturing, government, energy, and diversified employment dominant) and five EPZs (higher employment growth, recently higher growth, cyclical growth, and lower growth) MUELLER/ZIERING (1992) proved that economically-based diversification strategies deliver superior returns.[139] Comparing regional diversification strategies – NCREIF (four geographic regions), Solomon Brothers (eight economic regions),[140] a purely economic grouping of 316 MSAs using nine government SIC categories – MUELLER (1993) suggested that the EBC economic diversification strategy provided superior returns. Moreover, he showed that the dominant employment base of an MSA drives local growth and real estate returns except when the real estate market itself goes out of balance.[141]

In contrast, other scholars such as CAPOZZA/SEGUIN (1999) found evidence for a "diversification discount," resulting from higher general and administrative expenses.[142] Their results suggest that diversifying firms are not efficient on a company level because of the higher coordination and administrative expenses. Likewise, CRONQVIST/HOGFELDT/NILSSON (2001) argued that diversification discounts are not caused by diversification per se but by the anticipated costs due to rent dissipation in future diversifying acquisitions. The authors quantified the diversification discount at

[137] Cf. LEE, S./STEVENSON, S. (2005b); MUELLER, G.R./ZIERING, B.A. (1992); HARTZELL, D.J./SHULMAN, D.G./WURTZEBACH, C.H. (1987).

[138] Cf. HARTZELL, D.J./SHULMAN, D.G./WURTZEBACH, C.H. (1987), p.94.

[139] Cf. MUELLER, G.R./ZIERING, B.A. (1992), p. 385.

[140] The Solomon Brothers diversification strategy is a combination of economics and geography.

[141] Cf. MUELLER, G.R. (1993), p. 65.

[142] Cf. CAPOZZA, D.R./SEGUIN, P.J. (1999), p. 588-590.

about 20%.[143] In this light, CAMPBELL/PETROVA/SIRMANS (2003) showed that portfolio acquisitions by REITs are significantly positive for shareholders if the firms reconfirm their commitment to geographic focus.[144]

Trying to combine MSAs that are similar – based on economic likeliness – GOETZMANN/WACHTER (1995) linked different families of MSAs to each other. The analysis was based on vacancy data and aggregate rent as the determining parameters.[145] Including the effect of size in regional-geographic clusters, SMITH/HESS/LIANG (2005) differentiated eight size-tiered regions. In total, the authors classified the U.S. in seven clusters plus one (the Washington, DC, area): the New York corridor, Tech Centers (co-anchored by San Francisco Bay Area and Boston), Southern Growth (co-anchored by Atlanta and Dallas), the Heartland (anchored by Chicago), Lifestyle Centers (anchored by Florida and Southern California), and one cluster for all Opportunistic Markets. In this regard, the approach considers the dominance of a few large metropolitan areas, economic location, and, in case of ambiguity, geographic proximity. The authors took the point of view that these clusters are effective in diversification, market targeting, and benchmark exercises.[146]

Next, GILIBERTO/HOPKINS JR (1990) evaluated the application of eight regions/metropolitan areas of the United States. This distinction produced only minor improvements.[147] In contrast, other scholars such as BROWN/LING HIN (2000) have even found evidence for geographic diversification benefits on an intra-city level.[148]

Expanding the research on economic diversification, NELSON/NELSON (2003) constructed capacity clusters based on a whole subset of economic parameters regarding the economic performance (more than 30 variables), business vitality (more than 15 variables), and development capacity (more than 15 variables). The authors identified seven economic clusters. Looking at a 10-year period, states exhibit clear patterns or cycles of economic activity. Testing the portfolio development capacity in comparison to the "Salmon Brothers Regions," naïve regional diversification strategies, and

[143] Cf. CRONQVIST, H./HOGFELDT, P./NILSSON, M. (2001), p. 85-88.

[144] Cf. CAMPBELL, R.D./PETROVA, M./SIRMANS, C.F. (2003), p.363.

[145] Cf. GOETZMANN, W.N./WACHTER, S.M. (1995), p. 271-273.

[146] Cf. SMITH, A./HESS, R./LIANG, Y. (2005), p. 197-198.

[147] Cf. GILIBERTO, M./HOPKINS JR, R.E. (1990), no page.

[148] Cf. BROWN, R.J./LING HIN, L. (2000), p. 131.

NCREIF regions, the study indicated the superior performance of capacity clusters. In this context, a group of states that follow similar economic patterns exhibit geographic influences, meaning that states tend to be clustered in patterns related to their geographic location.[149]

Looking at international diversification, KLEIMAN/PAYNE/SAHU (2002) found that investors in real estate can derive benefits from diversification in the short run, but not in the long run. Analyzing random walks and market efficiency, the authors concluded that international markets are weak-form efficient.[150] Examining the benefits of international joint ventures (IJV) between REITs, CRUMLEY/FISHER (2005) provided evidence that IJV are a beneficial way for REITs to enter international markets.[151]

Although there is mixed evidence on the effect of geographic/regional diversification and specialization, the findings suggest that the set of underlying institutional and economic producing returns in the long-run differences is what matters. Precisely,

1) Property type is a dominant factor of REIT performance.
2) There is a direct link between property-type diversification and the performance of REITs.
3) A relationship exists between the degree of diversification and the investment style of a REIT.
4) Results regarding the integration or correlation of REIT sectors are inconsistent.
5) REITs have become more focused. Also, REITs have entered niche markets and operating environments.
6) Underlying institutional and economic differences are an important determinant of performance.
7) Diversification benefits increase by combining economic and geographic factors.
8) The purpose of any regional diversification strategy is to reduce non-systematic risk by investing in multiple properties with different location-specific factors. The literature review demonstrates that the majority of non-systematic risk factors is related to macroeconomic attributes and cycles at the country, regional, state, metro area, or submarket level.[152]

[149] Cf. NELSON, T.R./NELSON, S.L. (2003), p. 85.

[150] Cf. KLEIMAN, R.T./PAYNE, J.E./SAHU, A.P. (2002), p. 294.

[151] Cf. CRUMLEY, R./FISHER, D.K. (2005), p. 226.

[152] Country and micro factors are not subject to the analysis.

9) Results regarding the effect of diversification on performance are ambiguous.
10) Property types and REIT sectors are affected differently by economic and geographic factors.
11) There is a need for further research on the role of diversification strategies within REIT sectors and their effect on performance.

Therefore, the following hypotheses summarize and are based on the preceding evidence from the literature:

[H4] Real Estate Investment Growth and Diversification

"With an increasing size of the underlying property portfolio, REITs become more diversified by NCREIF region and markets."

This refers to the fact that the REIT sector as well as the companies have grown significantly over the study period. The hypothesis mirrors the research question whether this is automatically reflected in a higher or lower degree of concentration.

[H5] Real Estate Investment Growth and Size of Investment Properties

"The larger the size of REITs, the larger the individual size of the properties they invest in."

In this way, it is tested whether the access to public equity and debt has been reflected in larger investment volumes by the size of the individual properties.

3.1.3 Performance of Real Estate Investment Trusts Property Sectors

Lodging and Resort REITs

Research on the performance of lodging and resort REITs has shown that hotel real estate markets in particular are affected by national hotel cycles, external effects such as terrorism fears, regional hotel market dynamics, and the exposure to different hotel categories, e.g., mid-scale or high end.[153] WHEATON (2005); WHEATON/ROSSOFF

[153] Cf. MUELLER, G.R./ANIKEEFF, M.A. (2001); GALLAGHER, M./MANSOUR, A. (2000); HANSON, B. (1999); ANONYMOUS (1997); MALLEY, M. (1997).

(1998); WHEATON/ROSSOF (1997) analyzed the behavior of lodging and resort properties and demonstrated the volatility and fluctuations lodging and resort properties are subject to.[154] WHEATON/ROSSOFF (1998) investigated the cyclical behavior of the lodging industry in the U.S. and showed that lodging demand moves more closely with the economy than other sectors and at a higher cyclical frequency.[155] Analogically, WHEATON (2005) showed that fluctuations in the performance of resort properties is crucial to weather conditions, regional annual business, and that resort supply responds so elastically to any movements in prices that it effectively curtails any long-term property appreciation.[156]

Likewise, PAYNE (2006) analyzed the transmission of shocks across REIT subsector returns by using a Johansen-Juselius cointegration test and found that REIT subsectors are not cointegrated. Lodging REIT returns seemed to have the largest initial response.[157] Related, PAYNE/WATERS (2007) found that lodging is the only sector subsector in which the results support periodically collapsing bubbles, emphasizing the volatility of lodging REIT returns.[158]

In addition, some researchers have analyzed the performance of Hotel REITs. While the study by BRADY/CONLIN (2004) focused on the performance of REIT-owned properties and the impact of market power,[159] the analysis conducted by MOORADIAN/YANG (2001) emphasized dividend policy and firm performance of REITs and non-REIT hotel companies. MOORADIAN/YANG (2001) found for the period of 1993 to 1999 that non-REIT companies are on average more leveraged, pay lower dividends, and retain a larger amount of the free cash flow. Moreover, their regression analysis shows that book-to-market ratio is negatively related to free cash flow. In contrast, the study by BRADY/CONLIN (2004) found that REIT-owned properties did not perform significantly better but that REITs have a higher relative ownership in mid-scale or high end hotels. Finally, the authors concluded that the superior performance of the market segment (mid-scale and high-end hotels) is not attributable to the market power of REITs.[160]

[154] Cf. WHEATON, W.C./ROSSOF, L. (1997), no page.

[155] Cf. WHEATON, W.C./ROSSOFF, L. (1998), p. 67-68.

[156] Cf. WHEATON, W.C. (2005), p. 1-3.

[157] Cf. PAYNE, J.E. (2006), p. 72.

[158] Cf. PAYNE, J./WATERS, G. (2007), p. 207.

[159] Cf. BRADY, P.J./CONLIN, M.B. (2004), p. 92.

[160] Cf. MOORADIAN, R.M./YANG, S.X. (2001), p. 79-80; BRADY, P.J./CONLIN, M.B. (2004), p.82.

Taking a qualitative and descriptive approach, the paper by CORGEL (2005) described hotel market cycles and the disequilibrium in hotel asset markets.[161]

Industrial REITs

Several researchers have analyzed the performance of IN-REITs using property and market factors. The studied reveal different results regarding the factors that determine the performance of industrial real estate and IN-REITs. While MUELLER/MUELLER (2007); MUELLER/LAPOSA (1994a) identified the Path of Goods Movement (POGM) paradigm to explain the demand, supply, and location of industrial properties,[162] other scholars stressed the importance of property and market factors.[163]

MUELLER/LAPOSA (1994a) identified a paradigm to analyze the demand and location of warehouse space, the Path of Goods Movement. The authors demonstrated how the largest warehouse markets in the U.S. are either key ports of entry, or a combination of three or more interstate highways, at major air hubs, or a combination of the three. Major metro areas, for example, Los Angeles or Chicago, have a large base of industry and population that generate demand and provide a workforce.[164] Similarly, the analysis by MUELLER/MUELLER (2007) confirmed that growth in demand for warehouse space as well as location can be explained by the Path of Goods Movement. The authors demonstrated that locating warehouses along the POGM is the best way to make long-term investment decisions. Nonetheless, they also showed that locations have evolved and moved, and will probably continue to do so.[165]

Analyzing demand and supply effects from a different angle, CHENG/MEJIA/TU (2006) showed that the disequilibrium between the manufacturing goods and industrial space markets is partially explained by changes in space supply and demand. The authors' empirical analysis tested the effect of space supply and demand factors on the stock return spread between Industrial REITs and manufacturing companies. [166] Additionally,

[161] Cf. CORGEL, J.B. (2005), p. 92.

[162] Cf. MUELLER, G.R./MUELLER, A.G. (2007); MUELLER, G.R./LAPOSA, S.P. (1994a), p. 42-43.

[163] Cf. HWAHSIN, C./MEJIA, L.C./TU, C.C. (2006); ATTEBERRY, W.L./RUTHERFORD, R.C. (1993), p. 377 et seq.

[164] Cf. MUELLER, G.R./LAPOSA, S.P. (1994a), p. 42-43.

[165] Cf. MUELLER, G.R./MUELLER, A.G. (2007), p. 55.

[166] Cf. CHENG, H./MEJIA, L.C./TU, C.C. (2006), p. 258.

the authors' analysis showed the need for future research, including lags and leads that permit the use of vacancy history and expectations to incorporate recursive effects. Similarly, AMBROSE (1990) found that the market for industrial property is rational and that the majority (>75%) of the property value is determined by the building characteristics. Variables employed were building size, the amount of office space, the number of dock-high and drive-in doors, the presence of a railway siding, and the ability to build-to-suit office space; all were important in explaining the asking price. He also found that the building age and ceiling height were not important.[167] In contrast, ATTEBERRY/RUTHERFORD (1993), using a multivariate Granger-causality procedure, found that the monetary base and industrial construction caused changes in industrial real estate prices.[168]

Apartment REITs

Few studies explicitly target AP-REITs as their sole object of investigation. The study of HE (2000) performs Granger causality tests to examine different types of causal relationships between Apartment REITs stock returns and changes in unsecuritized real estate. The study provides evidence that there is a positive contemporaneous causality between Apartment REIT returns and new house prices. On the other hand, the study shows that there is not a strong contemporaneous causality between REIT returns and new house starts. The results suggest that their response to fundamental changes may be different.[169] Similarly, LIANG/CHATRATH/MCINTOSH (1996) aimed to analyze the risk/return profiles of Apartment REITs by capturing the volatility unique to apartment real estate. By investigating the topic for the period 1992-93, the authors construct a "hedged" Apartment REIT index that excludes the effects of EREITs and the stock market. In this context, they find that there is evidence to include Apartment REITs in some mixed-asset portfolios.[170]

In a different study, HARDIN III/WOLVERTON (1999) investigated whether Apartment REITs have paid a premium in property acquisitions for three local markets – Seattle,

[167] Cf. AMBROSE, B.W. (1990), p. 367.
[168] Cf. ATTEBERRY, W.L./RUTHERFORD, R.C. (1993), p. 384.
[169] Cf. HE, L.T. (2000), p. 365.
[170] Cf. LIANG, Y./CHATRATH, A./MCINTOSH, W. (1996), p. 281-282.

Phoenix, Atlanta – during the period 1993-95. The scholars used a log-linear regression model, including the variables "price," "age," "number of units," "EGI," "New Permits," and "Population." They concluded that Apartment REITs paid premiums of more than 25% in two of the three markets but could not find such evidence for the third market, Seattle. It can be noted that the number of markets was too small – and the time frame too short – to prove the persistence of EREIT premiums (paid for acquisitions) found.[171]

Retail REITs

Few studies focus entirely on the performance of Retail REITs. However, the study conducted by MYER/WEBB (1994a) examined the relationship between Retail REITs, retail stocks, and retail real estate from 1983 to 1991. Although finding a positive contemporaneous relationship between Retail REITs and stock, the study did not find such evidence for retail real estate. The results suggest that retail stocks and REITs are subject to shared fundamental factors in addition to the market return.

In addition, WEILER et al. (2003); MEJIA/BENJAMIN (2002); BENJAMIN/JUD (2000); BENJAMIN/JUD/WINKLER (1998b); BENJAMIN/JUD/WINKLER (1998a); BENJAMIN/BOYLE/SIRMANS (1990) analyzed the determinants of retail space markets.[172] BENJAMIN/JUD/WINKLER (1998a) demonstrated that retail rental prices are largely explained by the previous year's rental rate and the current year vacancy rate, with higher vacancy rates resulting in lower rents.[173] BENJAMIN/JUD/WINKLER (1998b) analyzed the supply of retail space and found a long mean lag of approx. eight years. Nonetheless, in some MSAs – mostly older cities such as Boston or Chicago – the supply response to changes in retail sales are rather inelastic.[174] BENJAMIN (1994) stressed and investigated the importance of anchor tenants (for RE-REITs) and the necessity of accurately forecasting retail sales.

[171] Cf. HARDIN III, W.G./WOLVERTON, M.L. (1999), p. 123.

[172] Cf. WEILER, S., et al. (2003); MEJIA, L.C./BENJAMIN, J.D. (2002); BENJAMIN, J.D./JUD, G.D. (2000); BENJAMIN, J.D./JUD, G.D./WINKLER, D.T. (1998b); BENJAMIN, J.D./JUD, G.D./WINKLER, D.T. (1998a); BENJAMIN, J.D./BOYLE, G.W./SIRMANS, C.F. (1990).

[173] Cf. BENJAMIN, J.D./JUD, G.D./WINKLER, D.T. (1998a), p. 10.

[174] Cf. BENJAMIN, J.D./JUD, G.D./WINKLER, D.T. (1998b), p. 305.

Office REITs

Recapitulating the studies on the performance determinants of Office REITs reveals an ambiguous picture. Analyzing investment attributes and determinants of Office REITs, the studies of HESS/LIANG (2003a) and SLADE (2000) have a different focus.[175] In contrast to the study by SLADE (2000),[176] the analysis conducted by HESS/LIANG (2003a) focused on the less cyclical attributes of office properties. The authors that REITs own a lower relative proportion of office properties by value. In addition, Hess and Liang's findings indicated that institutional investors have a strong preference for large markets and newer properties.[177]

By contrast, SLADE (2000) investigated the influence of individual rent determinants during different periods of the market cycle. The study looked at a six-year period and at asking rent, building area, story height, building height, building age, number of buildings in a complex, and a land factor as determinants of individual rents. The study showed that rental rates increase at a decreasing rate with respect to floor area and that this influence is more pronounced during periods of market recovery. Furthermore, the investigation demonstrated that rents decline with age and that this effect is stronger during periods of decline.[178] Again, the study conducted by PREI (1992) (Prudential Real Estate Investors) (1992) showed that demand drivers and supply cycles are mostly unrelated, resulting in only a modest return correlation. The study showed that AP-REITs have outperformed not only homeownership but also the NPI.[179] To conclude, evidence from previous studies suggest that

1) Lodging and resort REITs are considerably affected by national hotel cycles, geographic location of the portfolio, and external effects, e.g., weather, terrorism fears, or wage levels.
2) Industrial REIT performance is determined by property attributes and market factors that can best be explained by the Path of Goods Movement.
3) Retail REITs and stocks share similar fundamentals in addition to the market return.

[175] Cf. SLADE, B.A. (2000), p. 365; HESS, R./LIANG, Y. (2003a), p. 68.
[176] Cf. SLADE, B.A. (2000), p. 376-377.
[177] Cf. HESS, R./LIANG, Y. (2003a), p. 68-69.
[178] Cf. SLADE, B.A. (2000), p. 357.
[179] Cf. PREI (1992), p. 1.

4) There is a contemporaneous causality between Apartment REITs and stocks sharing the same response to fundamental changes but not between unsecuritized real estate.
5) Office REIT performance is caused by a set of cyclical and structural attributes, though the effect of the physical market cycle remains unclear.

To clarify the importance of space market factors (in various property types and local markets), the following hypotheses are tested:

[H6] Space Market Factors with Funds from Operation

"There is a significant positive relationship between occupancy and rent factors (levels and growth rates) and the earnings of REITs measured by FFO (levels and growth rates)."

[H7] Space Market Factors with the Pricing of REITs

"There is a significant positive relationship between occupancy and rent factors (levels and growth rates) and the pricing component of REITs measured by stock price change and FFO multiples (change)."

[H8] Funds from Operation with the Pricing of REITs

"There is a significant positive relationship between FFO (change) and the pricing of REITs measured by stock price change and FFO multiples (change)."

[H9] Inclusion of Time Lags

"The inclusion of time lags increases the predictive power of space market and earnings factors for the pricing of REITs."

[H10] Inclusion of a "Sales" or "Investment Market" Factor

"The higher the sales activities of a REIT in terms of properties sold, the higher its value in the stock market."

Important to note, the hypotheses specified before do not differentiate between sectors and companies, meaning that the hypotheses are tested multiple times for individual sectors such as the Office REIT sector as well as for individual companies such as Simon Properties, Inc. Again, the hypotheses shown below are the alternate hypotheses, not the null hypotheses.

These hypotheses are tested in the following chapters. The hypotheses are tested by either refuting or accepting the corresponding null hypothesis ("null effect"), that is to say, that the independent variable as specified above has no significant effect on the dependent variable. If the null hypothesis is nullified, the alternative hypothesis is supported. The following section illustrates the outline of the empirical analysis and gives reasons for the different steps of the study.

3.2 Study Setup and Data Sources

Based on the state of research and the theoretical framework and in line with the purpose of the study, the following section illustrates how the analysis is set up, where the different variables stem from, and what methodology is applied.

3.2.1 Period of Investigation

The aim of this analysis is to construct a sample that covers a preferably long period that encompasses at least one market cycle and construct subperiods of investigation if meaningful. Moreover, the individual spaces of time (monthly/quarterly/yearly) have to be determined. At this stage, the period of investigation depends on the availability of data from the three main data sources.

The availability of data on the underlying assets of REITs is the narrow point. SNL Real Estate covers "Property Size: Area" since 2003:Q4 on a quarterly basis and since 1995:Q1 on a yearly basis. The annual basis is preferred because it covers a significantly longer period. As a comparison, data on the performance of REITs, as

retrieved from Thomson Datastream, is available on a monthly basis for more than 25 years. The quarterly information on real estate cycle data is available for all markets for the whole sample period. Hence, the empirical analysis covers the period 1995 to 2006 on an annual basis.

Data in the empirical analysis come from different data providers: 1) SNL Real Estate, 2) Property & Portfolio Research, Inc. (PPR), 3) Market Cycle Monitor (Dividend Capital Trust, Glenn R. Mueller), and 4) Thomson Financial (Thomson Datastream). All providers are recognized as industry leaders in providing data in their respective fields: Thomson Datastream as the world's largest financial statistical database, PPR as the market leader in research on real estate cycles and the implications of investment strategies, and SNL Real Estate as the leader in providing comprehensive sector-specific information beyond financial data, especially at the property asset level. In this way, the following subchapter will specify the respective data sources.

3.2.2 Data Sources

Data on Real Estate Cycles of Individual Metro Areas

Data on real estate cycles includes a) absorption, b) completion, c) rent, d) stock, e) vacancy/occupancy and property-type specific variables, for example, f) RevPAR, and g) room rates for hotel properties. PPR collects this information for 54 individual metro areas and the following property types: a) apartments, b) hotels, c) office, d) retail, e) single family homes, and e) warehouse properties.[180]

Property & Portfolio Research, Inc. is an independent provider of real estate research and portfolio strategy services, focusing on institutional real estate market participants with research and analysis on real estate cycles and their implications for investment and portfolio management. PPR has one of the largest and most consistent datasets on real estate cycles in the United States. PPR itself retrieves the data from the following sources: Economic Data, www.economy.com, U.S. Census Bureau, Property & Portfolio Research, Inc., Rent Data, various local sources, U.S. Census Bureau, National Real Estate Index, Construction and Room Supply Data, Property & Portfolio Research, Inc., Reed Construction, Smith Travel Research, various sources, Sales Transactions,

[180] Cf. PPR (2007b), no page.

Real Capital Analytics, Occupancy and Vacancy Data, Property & Portfolio Research, Inc., U.S. Department of Commerce, Smith Travel Research, and various Brokerage sources.

The dataset provides complete coverage of individual metro areas including national averages. Data on real estate cycles originates from different sources and is then tracked by PPR's team of market analysts using bottom-up research that is performed at a metro-area level involving local and national data sources and is validated by external sources. As a consequence, PPR is regarded as the appropriate source for information on the market cycles of individual markets in the context of this study.

Data on the Property Holdings of Real Estate Investment Trusts

The data on the real estate holdings is derived from SNL Real Estate. The SNL Real Estate database offers sector-focused business intelligence. SNL is recognized as the premier information provider in the listed real estate sector because SNL is able to deliver a) accurate, b) relevant, c) timely, and, most important for the analysis, d) complete asset-level data coverage on U.S. REITs for the period of investigation.[181]

On average, SNL Real Estate processes 30,000 source documents per quarter that are aggregated from a variety of sources on the financial, asset, and operational levels. SNL Real Estate then standardizes the information, which is the basic requirement to compare information on the asset level for REITs. Therefore, the SNL database is able to deliver the necessary information on individual properties and holdings of individual REIT companies. Therefore, SNL is the only and appropriate data source able to deliver the data necessary for the purpose of this study.

Data on Real Estate Investment Trusts Earnings and Pricing

Thomson Datastream contains the majority of the necessary information on REIT financial data applied in the analysis, e.g., total return series for REIT. Moreover, Thomson Datastream covers the indices on REIT sector performance that are required

[181] Cf. Chapter 3.2.1: Period of Investigation, p. 72.

in the context of this study.[182] Performance data for REIT sectors as well as for individual REITs is retrieved from Datastream. In addition, FFO and FFO multiple indices are provided by SNL. The indices are available for the study period on a monthly, quarterly, and yearly basis. Also, Thomson Datastream is the source of the control variables used in the regression analysis.

Table 3: Economic Control Variables

Control Variables	Datastream Code
US GDP	USGDP
T-BILL- 3Mt	USGBILL3
CONS CONFIDENCE	USCNFCONQ
HOUSING MARKET INDEX	USNAHBMI
PERSONAL INCOME	USPERINCB
Population Growth	USPOPTOTP
EMPLOYED - NONFARM INDUSTRIES	USEMPALLO
CPI - ALL URBAN	USCONPRCE
Treas BOND 10 YR	USBD10Y

Source: DATASTREAM (2008), no page.

3.3 Specification of Variables

The variables that are dealt with in this analysis aim to be the best indicators of the respective markets that are core to the analysis: the "REIT stock market," operating performance on a company level, and the space markets. The intermediate step aims to link the property holdings that are internal to the REIT with the space market data from Property Portfolio Research, Inc., which is external to the REIT. Additionally, the "sales factor" aims to control for the effect or activity of a REIT (sector) in the investment market (only sales activities). Figure 15 shows the applied variables by their level. The differentiation between the FFO multiple (change) and the stock price change is necessary to differentiate between the relative value of a REIT and a sole price change.[183] On a space market level, the application of growth rates is preferred to the absolute levels of rents or occupancy wherever possible because growth rates are a more meaningful comparison, in particular between property types. Nonetheless, occupancy and rent levels are often intuitively easier to interpret, for example, when comparing the

[182] Cf. THOMSON (2007), no page.

[183] The stock price (not stock price change) is not a meaningful measure to compare REITs in the context of the analysis.

performance of REITs versus the overall market. Finally, the sales factor aims to picture the sales activities of REITs.

Figure 15: Overview of Variables

	REIT Sector Level	REIT Company Level
Stock Market Level	▪ FFO-Multiples ▪ FFO-Multiple Change ▪ Stock Price Change	▪ FFO-Multiples ▪ FFO-Multiple Change ▪ Stock Price Change
Company Level	▪ Funds from Operation ▪ Change in FFO	▪ Funds from Operation ▪ Change in FFO
Intermediate Step	▪ 5 Property Types ▪ 49 Markets ▪ 48 Periods	▪ 5 Property Types ▪ 49 Markets ▪ 48 Periods
Investment Market Level	▪ Sales factor (%) of properties sold	▪ Sales factor (%) of properties sold
Space Market Level	▪ Rent levels ($) ▪ Rental Growth Rates (%) ▪ Occupancy levels (%) ▪ Occupancy Change (%)	▪ Rent levels ($) ▪ Rental Growth Rates (%) ▪ Occupancy levels (%) ▪ Occupancy Change (%)

Source: SNL REAL ESTATE, PFEFFER.

To compare REIT property sectors, the performance on a company level as well as on a stock market level has to be investigated by comparing meaningful indices. In this analysis, the SNL indices represent the full universe of publicly traded REITs, and all indices will have price change figures, dividend yields, and total return end-of-day index calculations. All tax-qualified REITs with common shares traded on the New York Stock Exchange, American Stock Exchange, or NASDAQ National Market List will be eligible. The total return computation will be based on SNL's existing methodology that is used for the SNL/FTSE total return calculations. To be consistent with SNL's standard methodology, the following minimum size and liquidity rules for all indices apart from the SNL All REITs Index will be introduced. Only companies valued at more than $100 million at the date of the annual review will be eligible for inclusion in the indices. Minimum Liquidity: Securities that do not turn over at least 0.5% of their shares in issue per month in at least 10 of the 12 months before the annual review in December, after the application of any free float adjustments, will not be eligible for inclusion in the indices. An existing constituent failing to trade at least 0.5%

of its shares in issue per month for more than four of the 12 months before review, after application of any free float adjustments, will be removed on the next trading day following the third Friday in December. Any period during which the trading of shares is halted will be excluded from the above calculations. The table below illustrates the composition of the SNL Office REIT Index in 2007 that forms the basis for the calculation of aggregate FFO levels and so forth. After specifying the indices, the following section defines the space market, especially the integration of the data from the SNL (2007b) and PPR (2007a) databases.[184]

Table 4: Component Companies SNL US REIT Office

Trading Symbol	Company	Exchange	City	Weight
ARE-US	Alexandria Real Estate	NYSE	Pasadena	3.8
AFR-US	American Financial Realty Tr.	NYSE	Jenkintown	1.9
BMR-US	BioMed Realty Trust Inc.	NYSE	San Diego	2.4
BXP-US	Boston Properties Inc.	NYSE	Boston	17.0
BDN-US	Brandywine Realty Trust	NYSE	Radnor	3.8
COE-US	Columbia Equity Trust Inc.	NYSE	Washington, DC	0.3
OFC-US	Corporate Office Properties Tr	NYSE	Columbia	2.8
CEI-US	Crescent Real Estate Equities	NYSE	Fort Worth	2.6
DEI-US	Douglas Emmett Inc.	NYSE	Santa Monica	4.0
DRE-US	Duke Realty Corp.	NYSE	Indianapolis	7.1
EOP-US	Equity Office Properties Trust	NYSE	Chicago	22.1
GPT-US	Government Properties Trust	NYSE	Omaha	0.3
HIW-US	Highwoods Properties Inc.	NYSE	Raleigh	3.0
HRP-US	HRPT Properties Trust	NYSE	Newton	3.4
KRC-US	Kilroy Realty Corp.	NYSE	Los Angeles	3.3
CLI-US	Mack-Cali Realty Corp.	NYSE	Edison	4.2
MPG-US	Maguire Properties Inc.	NYSE	Santa Monica	2.5
MSW-US	Mission West Properties Inc.	AMEX	Cupertino	0.3
PKY-US	Parkway Properties Inc.	NYSE	Jackson	1.0
RA-US	Reckson Associates Realty Corp	NYSE	Uniondale	5.0
RPB-US	Republic Property Trust	NYSE	Herndon	0.4
SLG-US	SL Green Realty Corp.	NYSE	New York	8.6

Source: SNL-DATABASE (2007), no page.

3.3.1 Space Market Data on Property Types and Individual Metro Areas

The PPR database covers real estate fundamentals (vacancy rates, demand, supply, and rent changes) on a quarterly basis for 54 U.S. markets. Furthermore, the report includes an employment summary and demographic trends as well as planned construction. Each metro area covers five property types, which results in a total of 270 reports for each

[184] The composition of the indices is based on SNL.

quarter, thus 1080 for one year and 12,960 over 12 years.[185] The five property types covered by PPR are defined and classified as follows:

Apartment

This category includes attached housing of five units and more in rental apartment buildings. Owner-occupied housing, such as condominiums and townhouses, is not included. Student dormitories are not included. The Single Family category includes detached units that stand alone. Real estate fundamentals for apartments and multifamily and single-family houses are collected separately.

Office

The office category includes all types of office buildings. Commercial banks, financial buildings that serve as office space, and owner-occupied space, including corporate headquarters and branch offices, are all included. Government administration buildings, with the exception of courthouses, capitols, police and fire stations, and city halls, are also included. Office R&D space is included in this category if the buildings are used primarily for office space. Medical facilities are excluded.

Retail

PPR tracks several major categories of retail space, including shopping centers, stores, food stores, and stores excluding food. These categories can be further grouped into the following retail types: Neighborhood/Grocery-Anchored Center (Size: 30,000-149,999 SF); Open-air Strip Center that is anchored by a full-format grocery store with some inline space; Community Center (Size: 150,000-399,999 SF); Open-air strip center with two or more anchors (may include grocery), connected by inline space, Power/Big-Box Centers (Size: 400,000-800,000 SF); Open-air center consisting of several national big-box retailers (i.e., Home Depot, Target), may include inline space or outparcels; Regional/super-regional Mall (Size: 750,000 SF or greater); Enclosed shopping center typically anchored by three or more large stores (primarily traditional department

[185] Cf. Chapter 3.2.1: Period of Investigation, p. 72.

stores); Lifestyle center (Size: 100,000-500,000 SF); and Open-air center consisting of several upscale specialty retailers. These centers have a high architectural, fashion, and entertainment component.

Warehouse

The warehouse category includes storage and distribution buildings, including loading/unloading facilities. Warehousing used for production and light manufacturing is included if the space is served by loading docks and the primary operation of the space is the storage and/or movement of goods. Flex space and light industrial space may be included if they are used primarily for warehouse needs.

Hotel

The hotel category includes hotels, motels, and resorts. Hotel categories include budget, economy, mid-scale, upscale, luxury, extended stay, and independent hotels.[186] By market price segements, STR (2007a), for example, classifies hotels in five categories: Luxury (Top 15%), Upscale (next 15%), mid-price (middle 30%), Economy (next 20%) and Budget (lowest 20%) of a metro area.[187]

Having described the characteristics of the sample on the physical market cycles, the present sample covers the vast majority of markets REITs invest in. Furthermore, national averages can be obtained that can be taken as an indicator for the small number of markets not covered individually. In the next step, the following section describes the data on the real estate holdings of REITs.

Since some illustrations in the analysis refer to NCREIF regions and do not show the 49 markets (for reasons of clarity), it is vital to know the respective NCREIF regions of an MSA and vice versa. As shown in Table 5, NCREIF regions contain between three (West North) and eight MSAs (North East and East North) as classified before. It is important to note that the number of MSAs in an NCREIF region is not necessarily a good indicator of the market size and differs among property types.

[186] Cf. PPR (2007a), no page.

[187] Cf. STR (2007a), no page.

Table 5: NCREIF Classification of Markets

MSA	NCREIF	MSA	NCREIF	MSA	NCREIF
Chicago	EN	Boston	NE	Honolulu	PC
Cincinnati	EN	Bridgeport	NE	Los Angeles	PC
Cleveland	EN	Hartford	NE	Sacramento	PC
Detroit	EN	Indianapolis	NE	San Diego	PC
Jacksonville	EN	New York	NE	San Francisco	PC
Milwaukee	EN	Philadelphia	NE	San Jose	PC
Richmond	EN	Pittsburgh	NE	Seattle	PC
Washington, DC	EN	Portland	NE	**Pacific Region**	**7**
East-North Region	**8**	**North-East Region**	**8**	Atlanta	SE
Baltimore	ME	Austin	SW	Memphis	SE
Charlotte	ME	Dallas	SW	Miami	SE
Columbus	ME	Houston	SW	Nashville	SE
Raleigh	ME	New Orleans	SW	Orlando	SE
Virginia Beach	ME	Oklahoma	SW	Palm Bay	SE
Mid-East Region	**5**	San Antonio	SW	Tampa	SE
Denver	MT	**South-West Region**	**6**	**South-East Region**	**7**
Las Vegas	MT	Kansas	WN		
Phoenix	MT	Minneapolis	WN		
Salt Lake	MT	St. Louis	WN		
Mid-East Region	**4**	**West-North Region**	**3**		

Source: NREIF, PFEFFER.

3.3.2 Property Holdings of Real Estate Investment Trusts

Adapted from the purpose of the study, the following section illustrates how the data on the underlying assets of individual REITs is aggregated. To serve the aim of the analysis, how information on the respective sectors is collected is shown. Following the previous section, data on five REIT sectors – office, retail, warehouse, apartment, and warehouse – has to be obtained. Below is described how the information from SNL Real Estate is handled.

General

The original sample retrieved from SNL contains all properties held by North American REITs or REOCs that are part of the current portfolio or were part of the portfolio from 1995 to 2006. The sample excludes planned acquisitions and constructions. Moreover, dockside casinos, cruise ships, casinos, and track casinos held by REITs are excluded.

In the second step, property information variables and property financial variables necessary for the analysis were downloaded for individual REIT companies. The variables used are defined in the following way.

1. Company and Individual Property Key: The property key is a unique numeric number that identifies each individual property asset. The original sample contains more than 63,000 properties held by REITs and REOCs held over the sample period or part of it.
2. Property Identification: The sample contains property names for more than 56,000 properties and information during which years the property was held by the respective REIT.
3. Property Size: Property area is defined as the total interior area of the building(s) and is available for each building if it was held by a REIT/REOC in the respective year, for example, more than 24,000 buildings in 2005.
4. Property Location: Address, City, State, Zip-Code, Non-U.S. postal code, County, Country, NCREIF Region,[188] Economic Region,[189] MSA Code, and MSA Name for more than 56,000 properties. The MSA Code is not available for foreign properties. Thus, Canadian properties are summarized in a separate category and all other foreign properties in the category International.
5. Property Description: Primary and Secondary Property Type, Building Class, Year Built, Year Renovated, Year Refurbished. The secondary property type details the purpose for which the property is intended, e.g., R&D for an office building.

Sector Classification

[188] NCREIF is defined as Geographical region in which the property is located. NE (Northeast): ME,VT,NH,NY,CT,RI,MA,PA,NJ,DE, ME (Mideast): MD,WV,VA,KY,NC,SC,DC, SE (Southeast): TN,GA,FL,AL,MS, EN (East North Central): MI,IL,OH,IN,WI, WN (West North Central): MN,IA,MO,KS,NE,SD,ND, SW (Southwest): TX,OK,AR,LA, MT (Mountain): MT,ID,WY,UT,CO,NM,AZ,NV, PC (Pacific): WA,OR,CA,AK,HI, NA.

[189] Economic Regions are defined as the region in which the property is located. New England (ME,VT,NH,CT,RI,MA), Mid-Atlantic Corridor (NJ,DE,MD,DC), New South (VA,NC,SC,GA,FL,AL,MS,TN,KY,AR), Industrial Midwest (NY,PA,WV,OH,IN,IL, Eastern Counties of MI), Farm Belt (WI,MN,IA,MO,NE,KS,SD,ND, Western Counties of MI), Mineral Extraction (MT,ID,WY,UT,NV,CO,NM,AK,TX,OK,LA), Northern CA (WA,OR, Northern Counties of CA), Southern CA (AZ,HI, Southern Counties of CA).

In line with the purpose of the study and based on the SNL Real Estate classification of REITs, diversified, healthcare, manufactured homes, self-storage, and specialty REITs are excluded from the sample. These REITs are partly historical as well as current companies ("C" for current/"H" for historic). Moreover, market cycle data − as needed in the context of this analysis – is available only for the "major five food groups" of REITs (Office, Retail, Industrial, Apartment, and Hotel REITs).

Metropolitan Statistical Area (MSA)

The new five-digit code supplied by the Office of Management and Budget defines Metropolitan and Metropolitan Statistical Areas. These are collectively called the Core Based Statistical Areas (CBSA). Metropolitan Statistical Areas have at least one urbanized area of 50,000 or more people, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. Micropolitan Statistical Areas – a new set of statistical areas – have at least one urban cluster of at least 10,000 people but fewer than 50,000 people, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. Metropolitan and Micropolitan Statistical Areas are defined in terms of whole counties (or equivalent entities), including in the six New England states.[190]

Consolidation of Property Holdings and Market Cycle Data

This section gives a summary of how the different data sources are integrated into one sample. At first, the classifications were checked for concordance and differences. While the PPR metro classification differentiates 54 markets, the SNL Real Estate classification distinguishes 48 different markets. The six markets not tracked individually by SNL Real Estate are the following: 1) East Bay, California, 2) Fort Lauderdale, Florida, 3) Inland Empire, California, 4) Long Island, New York, 5) North – Central New Jersey, and 6) Orange County, California. The six markets are relatively small in comparison to the other markets covered and are included in larger markets, for example, "Fort Lauderdale" (PPR) is part of the metro region "Miami – Fort Lauderdale – Pompano Beach" (SNL).

[190] Cf. OMB (2008), no page.

Table 6: Consolidation of Markets

No	Market Classification PPR	No	Market Classification SNL
1	Atlanta, GA	1	Atlanta-Sandy Springs-Marietta, GA
2	Austin, TX	2	Austin-Round Rock, TX
3	Baltimore, MD	3	Baltimore-Towson, MD
4	Boston, MA	4	Boston-Cambridge-Quincy, MA-NH
5	Charlotte, NC-SC	5	Charlotte-Gastonia-Concord, NC-SC
6	Chicago, IL	6	Chicago-Naperville-Joliet, IL-IN-WI
7	Cincinnati, OH-KY-IN	7	Cincinnati-Middletown, OH-KY-IN
8	Cleveland, OH	8	Cleveland-Elyria-Mentor, OH
9	Columbus, OH	9	Columbus, OH
10	Dallas - Fort Worth, TX	10	Dallas-Fort Worth-Arlington, TX
11	Denver, CO	11	Denver-Aurora, CO
12	Detroit, MI	12	Detroit-Warren-Livonia, MI
13	East Bay, CA	***42***	***San Francisco-Oakland-Fremont, CA***
14	Fort Lauderdale, FL	***22***	***Miami-Fort Lauderdale-Pompano Beach, FL***
15	Hartford, CT	13	Hartford-West Hartford-East Hartford, CT
16	Honolulu, HI	14	Honolulu, HI
17	Houston, TX	15	Houston-Sugar Land-Baytown, TX
18	Indianapolis, IN	16	Indianapolis-Carmel, IN
19	Inland Empire, CA	***20***	***Los Angeles-Long Beach-Santa Ana, CA***
20	Jacksonville, FL	17	Jacksonville, FL
21	Kansas City, MO-KS	18	Kansas City, MO-KS
22	Las Vegas, NV	19	Las Vegas-Paradise, NV
23	Long Island, NY	***27***	***New York-Northern New Jersey-Long Island, NY-NJ-PA***
24	Los Angeles, CA	20	Los Angeles-Long Beach-Santa Ana, CA
25	Memphis, TN	21	Memphis, TN-MS-AR
26	Miami, FL	22	Miami-Fort Lauderdale-Pompano Beach, FL
27	Milwaukee, WI	23	Milwaukee-Waukesha-West Allis, WI
28	Minneapolis, MN-WI	24	Minneapolis-St. Paul-Bloomington, MN-WI
29	Nashville, TN	25	Nashville-Davidson-Murfreesboro-Franklin, TN
30	New Orleans, LA	26	New Orleans-Metairie-Kenner, LA
31	New York, NY - NJ	27	New York-Northern New Jersey-Long Island, NY-NJ-PA
32	Virginia Beach-Norfolk, VA	28	Virginia Beach-Norfolk-Newport News, VA-NC
33	North - Central New Jersey, NJ	***27***	***New York-Northern New Jersey-Long Island, NY-NJ-PA***
34	Oklahoma City, OK	29	Oklahoma City, OK
35	Orange County, CA	***20***	***Los Angeles-Long Beach-Santa Ana, CA***
36	Orlando, FL	30	Orlando-Kissimmee, FL
37	Palm Beach County, FL	31	Palm Bay-Melbourne-Titusville, FL
38	Philadelphia, PA-NJ	32	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
39	Phoenix, AZ	33	Phoenix-Mesa-Scottsdale, AZ
40	Pittsburgh, PA	34	Pittsburgh, PA
41	Portland, OR	35	Portland-Vancouver-Beaverton, OR-WA
42	Raleigh, NC	36	Raleigh-Cary, NC
43	Richmond, VA	37	Richmond, VA
44	Sacramento, CA	38	Sacramento-Arden-Arcade-Roseville, CA
45	Salt Lake City, UT	39	Salt Lake City, UT
46	San Antonio, TX	40	San Antonio, TX
47	San Diego, CA	41	San Diego-Carlsbad-San Marcos, CA
48	San Francisco, CA	42	San Francisco-Oakland-Fremont, CA
49	San Jose, CA	43	San Jose-Sunnyvale-Santa Clara, CA
50	Seattle, WA	44	Seattle-Tacoma-Bellevue, WA
51	Stamford, CT	45	Bridgeport-Stamford-Norwalk, CT
52	St. Louis, MO-IL	46	St. Louis, MO-IL
53	Tampa, FL	47	Tampa-St. Petersburg-Clearwater, FL
54	Washington, DC-NoVA-MD	48	Washington, DC-Arlington-Alexandria, DC-VA-MD-WV

Source: PPR (2007a); SNL-DATABASE (2007).

Apparently, not all properties are within the 48 metro regions (SNL classification). All properties in the U.S. that are not part of the 48 metro regions are summarized in the category "U.S. (others)" that consists of smaller metro regions and micropolitan statistical areas (Micro Area). In the context of this study, these markets are also referred to as "∑ B-Metro Areas & Micro Areas" or "∑ Mid- & Small-size Markets." Furthermore, REITs invest in foreign properties – mostly Canadian properties – that are classified into two groups: "Canada" and "International" properties. The number of properties not included in one of the 48 metro regions is small for some sectors such as office (less than 10%) and high for other sectors such as retail (more than 30%).

3.4 Scope and Limitations of the Sample

The original sample covers all relevant companies and all property holdings of North American REITs and REOCs over the sample period. Precisely, the original sample contains 64,636 properties held by existing or historic REITs and REOCs between 1995 and 2006. For instance, the SNL Real Estate dataset on the holdings only of office properties (including sold properties) by North American REITs includes information on more than 9,600 individual office properties for 2006 only. Nonetheless, the sample had to be corrected for various real estate holdings in view of the purpose of the study.

3.4.1 Office Real Estate Investment Trust Sample

The Office REIT sample includes all Office REITs that are part of at least one year of the sample period. As shown in the table below, the sample includes historic as well as current REITs in order to avoid survivorship bias and to reveal a complete picture of the segment. Consequently, all office properties held by these companies from the office properties sample are defined as the aggregate property count of in-service owned Office assets as of the end of the period as reported by the company. Since the study analyzes the role of the underlying assets for REIT sectors, a clear and accurate differentiation of property holding is necessary. Accordingly, the office properties

sample was corrected for office properties held by other equity REITs with another investment focus, especially diversified REITs.[191]

Table 7: Office REIT Sample

Company Name	C/H	Focus	Type	REIT
Alexandria Real Estate Equities, Inc.	C	Equity	Office	Yes
American Financial Realty Trust	C	Equity	Office	Yes
AmeriVest Properties Inc.	H	Equity	Office	Yes
Arden Realty Inc.	H	Equity	Office	Yes
Bedford Property Investors, Inc.	H	Equity	Office	Yes
BioMed Realty Trust, Inc.	C	Equity	Office	Yes
Boston Properties, Inc.	C	Equity	Office	Yes
Brandywine Realty Trust	C	Equity	Office	Yes
CarrAmerica Realty Corporation	H	Equity	Office	Yes
Columbia Equity Trust, Inc.	H	Equity	Office	Yes
Corporate Office Properties Trust	C	Equity	Office	Yes
Crescent Real Estate Equities Company	H	Equity	Office	Yes
CRT Properties, Inc.	H	Equity	Office	Yes
Douglas Emmett, Inc.	C	Equity	Office	Yes
Duke Realty Corporation	C	Equity	Office	Yes
Equity Office Properties Trust	H	Equity	Office	Yes
Glenborough Realty Trust Incorporated	H	Equity	Office	Yes
Government Properties Trust, Inc.	H	Equity	Office	Yes
Great Lakes REIT	H	Equity	Office	Yes
Highwoods Properties, Inc.	C	Equity	Office	Yes
HRPT Properties Trust	C	Equity	Office	Yes
Kilroy Realty Corporation	C	Equity	Office	Yes
Mack-Cali Realty Corporation	C	Equity	Office	Yes
Maguire Properties, Inc.	C	Equity	Office	Yes
Mission West Properties, Inc.	C	Equity	Office	Yes
Parkway Properties, Inc.	C	Equity	Office	Yes
Prentiss Properties Trust	H	Equity	Office	Yes
Prime Group Realty Trust	H	Equity	Office	Yes
Prudential Realty Trust	H	Equity	Office	Yes
PS Business Parks, Inc.	H	Equity	Office	Yes
Reckson Associates Realty Corporation	H	Equity	Office	Yes
Republic Property Trust	H	Equity	Office	Yes
SL Green Realty Corp.	C	Equity	Office	Yes
Trizec Properties, Inc.	H	Equity	Office	Yes

Source: Own compilation.

3.4.2 Industrial Real Estate Investment Trust Sample

The Industrial REIT sample represents a nearly complete picture of the Industrial REIT segment. This sample contains all Industrial REITs that were active during the period of investigation and includes the aggregate property count of in-service owned industrial assets as of the end of the period as reported by the company. The industrial portfolio

[191] Refer to Table 2: REIT Sectors and Subsectors.

size is measured by the aggregate area contained in owned industrial assets as of the end of the period as reported by the company. Warehouse properties sample: The warehouse properties sample includes industrial and logistics facilities, excluding self-storage buildings that are summarized in a different category.

Table 8: Industrial REIT Sample

Company Name	C/H	Focus	Type	REIT
AMB Property Corporation	C	Equity	Industrial	Yes
Cabot Industrial Trust	H	Equity	Industrial	Yes
Catellus Development Corporation	H	Equity	Industrial	Yes
CenterPoint Properties Trust	H	Equity	Industrial	Yes
Copley Properties, Inc.	H	Equity	Industrial	Yes
DCT Industrial Trust Inc.	C	Equity	Industrial	Yes
EastGroup Properties, Inc.	C	Equity	Industrial	Yes
First Industrial Realty Trust, Inc.	C	Equity	Industrial	Yes
First Potomac Realty Trust	C	Equity	Industrial	Yes
Liberty Property Trust	C	Equity	Industrial	Yes
Monmouth Real Estate Investment Corporation	C	Equity	Industrial	Yes
Pacific Gulf Properties, Inc.	H	Equity	Industrial	Yes
ProLogis	C	Equity	Industrial	Yes
TriNet Corporate Realty Trust, Inc.	H	Equity	Industrial	Yes

Source: Own compilation.

3.4.3 Retail Real Estate Investment Trust Sample

The Retail Real Estate Investment Trusts sample constitutes the largest sector within the empirical analysis of REIT sectors. The sample contains three major subcategories of Retail REITs: Regional Mall REITs, Shopping Center REITs and Other Retail REITs such as outlet centers, power centers and single tenant centers as specified in chapter 2.3.3.

The Retail REIT sample contains the aggregate property count of in-service owned retail assets as of the end of the period as reported by the company and the aggregate area contained in owned retail assets as of the end of the period. Retail properties sample: The retail property sample contains different categories of retail spaces such as regional malls or shopping centers. In this light, the largest group within the retail segment are Shopping Center REITs by number of companies, followed by Regional Mall REITs and Retail: Others REITs being the smallest group of REITs in the investigation.

Table 9: Retail REIT Sample

Company Name	C/H	Focus	Type	REIT
Acadia Realty Trust	C	Equity	Shopping Center	Yes
Aegis Realty, Inc.	H	Equity	Shopping Center	Yes
Agree Realty Corporation	C	Equity	Retail: Other	Yes
Alexander's, Inc.	C	Equity	Regional Mall	Yes
AmREIT	C	Equity	Shopping Center	Yes
Atlantic Realty Trust	H	Equity	Shopping Center	Yes
Bradley Real Estate, Inc.	H	Equity	Shopping Center	Yes
Burnham Pacific Properties, Inc.	H	Equity	Shopping Center	Yes
CBL & Associates Properties, Inc.	C	Equity	Regional Mall	Yes
Cedar Shopping Centers, Inc.	C	Equity	Shopping Center	Yes
Center Trust, Inc.	H	Equity	Shopping Center	Yes
Developers Diversified Realty Corporation	C	Equity	Shopping Center	Yes
Equity One, Inc.	C	Equity	Shopping Center	Yes
Federal Realty Investment Trust	C	Equity	Shopping Center	Yes
Feldman Mall Properties, Inc.	C	Equity	Regional Mall	Yes
First Washington Realty Trust, Inc.	H	Equity	Shopping Center	Yes
General Growth Properties, Inc.	C	Equity	Regional Mall	Yes
Getty Realty Corp.	C	Equity	Retail: Other	Yes
Glimcher Realty Trust	C	Equity	Regional Mall	Yes
Heritage Property Investment Trust, Inc.	H	Equity	Shopping Center	Yes
Inland Real Estate Corporation	C	Equity	Shopping Center	Yes
Kimco Realty Corporation	C	Equity	Shopping Center	Yes
Kimsouth Realty, Inc.	H	Equity	Shopping Center	Yes
Kite Realty Group Trust	C	Equity	Shopping Center	Yes
Kramont Realty Trust	H	Equity	Shopping Center	Yes
Macerich Company	C	Equity	Regional Mall	Yes
Malan Realty Investors, Inc.	H	Equity	Shopping Center	Yes
Mills Corporation	H	Equity	Regional Mall	Yes
MSA Realty Corporation	H	Equity	Shopping Center	Yes
National Retail Properties, Inc.	C	Equity	Retail: Other	Yes
New Plan Excel Realty Trust, Inc.	H	Equity	Shopping Center	Yes
One Liberty Properties, Inc.	C	Equity	Retail: Other	Yes
Pan Pacific Retail Properties, Inc.	H	Equity	Shopping Center	Yes
Pennsylvania Real Estate Investment Trust	C	Equity	Regional Mall	Yes
Ramco-Gershenson Properties Trust	C	Equity	Shopping Center	Yes
Realty Income Corporation	C	Equity	Retail: Other	Yes
Regency Centers Corporation	C	Equity	Shopping Center	Yes
Saul Centers, Inc.	C	Equity	Shopping Center	Yes
Simon Property Group, Inc.	C	Equity	Regional Mall	Yes
Tanger Factory Outlet Centers, Inc.	C	Equity	Retail: Other	Yes
Taubman Centers, Inc.	C	Equity	Regional Mall	Yes
Urban Shopping Centers, Inc.	H	Equity	Regional Mall	Yes
Urstadt Biddle Properties Inc.	C	Equity	Shopping Center	Yes
USP Real Estate Investment Trust	H	Equity	Shopping Center	Yes
Weingarten Realty Investors	C	Equity	Shopping Center	Yes
Westfield America, Inc.	H	Equity	Shopping Center	Yes

Source: Own compilation.

3.4.4 Hotel Real Estate Investment Trust Sample

The Hotel REIT sample consists of 22 companies as shown in Table 10: Hotel REIT. As listed, the lodging and resort REIT sample contains different categories of Hotel REITs: Extended Stay, Full Service, and Limited Service. The assets included are the aggregate property count of in-service owned hotel assets as of the end of the period as reported by the company. Nonetheless, instead of property size, RevPAR (Revenue per Available Room) and ADR (Average daily room rate) are chosen as the appropriate indicators for size (and performance measurement). Hotel properties sample: The hotel property sample includes hotels, motels, and resorts of all categories (Hotel categories include budget, economy, mid-scale, upscale, luxury, extended stay, and independent hotels). The differences between the subtypes are discussed in chapter 5.5.[192]

Table 10: Hotel REIT Sample

Company Name	C/H	Focus	Type	Subtype	REIT
Americana Hotels and Realty Corporation	H	Equity	Hotel	Full Service	Yes
Ashford Hospitality Trust, Inc.	C	Equity	Hotel	Full Service	Yes
Boykin Lodging Company	H	Equity	Hotel	Full Service	Yes
DiamondRock Hospitality Co.	C	Equity	Hotel	Hotel	Yes
Eagle Hospitality Properties Trust, Inc.	H	Equity	Hotel	Full Service	Yes
Equity Inns, Inc.	H	Equity	Hotel	Limited Service	Yes
FelCor Lodging Trust Incorporated	C	Equity	Hotel	Full Service	Yes
Hersha Hospitality Trust	C	Equity	Hotel	Limited Service	Yes
Highland Hospitality Corporation	H	Equity	Hotel	Hotel	Yes
Hospitality Properties Trust	C	Equity	Hotel	Limited Service	Yes
Host Hotels & Resorts, Inc.	C	Equity	Hotel	Full Service	Yes
Innkeepers USA Trust	H	Equity	Hotel	Extended Stay	Yes
LaSalle Hotel Properties	C	Equity	Hotel	Full Service	Yes
MeriStar Hospitality Corporation	H	Equity	Hotel	Full Service	Yes
MHI Hospitality Corporation	C	Equity	Hotel	Full Service	Yes
Strategic Hotels & Resorts, Inc.	C	Equity	Hotel	Full Service	Yes
Sunstone Hotel Investors, Inc.	C	Equity	Hotel	Full Service	Yes
Supertel Hospitality, Inc.	C	Equity	Hotel	Limited Service	Yes
Winston Hotels, Inc.	H	Equity	Hotel	Limited Service	Yes

Source: Own compilation.

In summary, the five REIT sector samples represent accurately the property holdings of their respective sectors. These are the object of investigation in the following analysis as described in the following sections.

[192] Cf. Chapter 5.5, p. 283.

3.4.5 Exclusions and Sample Specifications

The following section specifies which groups are part of the REITs sample and which groups are excluded:

- Historic and current REITs: The data sample explicitly includes historic REITs in the sample for the respective time of their existence. This reveals a more complete picture of the industry and avoids a survivorship bias of the sample. Thus, historic REITs are included in the yearly sample if available. Moreover, these REITs have been part of the current indices and benchmark and should not be excluded for reasons of accuracy and completeness of the analysis.
- Canadian REITs: Canadian REITs are excluded from the sample.
- REOCs: Real estate operating companies are excluded from the sample.
- Other REIT sectors: Holdings of other REIT sectors, for example, an office building hold by a Healthcare REIT are excluded.
- Finite REITs: Finite REITs are REITs that plan to liquidate all of their holdings by a specified date in order to realize capital gains, rather than to operate as going concerns. Therefore, these REITs are not included in the sample.[193]
- Planned acquisitions, construction, or REITs with a pending IPO are not included.
- Land holdings: Land holdings are excluded.
- Parking Spaces: Parking spaces, if part of a REIT's portfolio, are excluded.

Hybrid and Mortgage REITs

In contrast to Equity REITs, Mortgage REITs deal entirely with investing and owning mortgages from real estate. In this way, mortgage REITs loan money for mortgages to owners of real estate or invest in existing mortgages or even mortgage-backed securities. Consequently, revenues are generated primarily by the interest received from the mortgage loans. Hybrid REITs are another investment focus because they combine

[193] Cf. INVESTORWORDS (2007b), no page.

the investment strategies of Equity REITs and Mortgage REITs by investing in both: individual properties and property mortgages.

Table 11: Excluded Hybrid and Mortgage REITs

Company Name	"C"/"H"	Focus	Type	Subtype	REIT
Arizona Land Income Corporation	C	Hybrid	Diversified	Diversified	Yes
CapLease, Inc.	C	Hybrid	Diversified	Diversified	Yes
LNH REIT, Inc.	H	Hybrid	Diversified	Diversified	Yes
Pittsburgh & West Virginia Railroad	C	Hybrid	Diversified	Diversified	Yes
Property Capital Trust	H	Hybrid	Diversified	Diversified	Yes
Vanguard Real Estate Fund II	H	Hybrid	Diversified	Diversified	Yes
LTC Properties, Inc.	C	Hybrid	Healthcare	Healthcare	Yes
National Health Investors, Inc.	C	Hybrid	Healthcare	Healthcare	Yes
Omega Healthcare Investors, Inc.	C	Hybrid	Healthcare	Healthcare	Yes
PMC Commercial Trust	C	Hybrid	Hotel	Limited Service	Yes
Monmouth Capital Corporation	H	Hybrid	Industrial	Industrial	Yes
Presidential Realty Corporation	C	Hybrid	Apartment	Apartment	Yes
Ocwen Asset Investment Corp.	H	Hybrid	Office	Office	Yes
Trustreet Properties, Inc.	H	Hybrid	Specialty	Restaurant	Yes
Allied Capital Commercial Corpor.	H	Mortgage	Diversified	Diversified	Yes
Angeles Mortgage Investment Trust	H	Mortgage	Diversified	Diversified	Yes
Banyan Short Term Income Trust	H	Mortgage	Diversified	Diversified	Yes
Metropolitan Realty Corporation	H	Mortgage	Diversified	Diversified	Yes
Resort Income Investors, Inc.	H	Mortgage	Diversified	Diversified	Yes
CRI Liquidating REIT Inc.	H	Mortgage	Apartment	Apartment	Yes
Rockefeller Center Properties, Inc.	H	Mortgage	Office	Office	Yes

Source: Own compilation.

Based on the scope and limitations applied to the sample construction, it can be stated that the sample of REITs is a) accurate, b) complete, c) and consistent, and d) covers a fairly long period of 12 years. Also, the sample does not suffer from survivorship-bias because historic REITs are included in the sample as well as current real estate investment trusts.[194]

As shown in Table 12, the share of foreign properties is relatively low, accounting for less than 1% on average of the total portfolio on average. The only sector that has become more internationalized in recent years is the Industrial REIT sector. At this, the two largest Industrial REITs ProLogis and AMB represent more than 90% of all foreign industrial real estate holdings. Moreover, the table demonstrates that REITs do not have major property holdings in Canada. Nonetheless, the share of foreign properties has increased during the last years.

[194] Cf. SAGALYN, L.B. (1990), p. 203.

Table 12: Excluded Foreign Property Holdings

%	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Ø
Canada (Office)	0	0	0	0	0	0	0	0	0	0	0	0	**0.0**
International (Office)	0	0	0	0	0	0	0	0	0	0	0	0	**0.0**
Canada (Industrial)	0	0	0	0	0	0	0	0	0	0	0	0	**0.0**
International (Industrial)	0	0	0	0	0	0	0	6	7	8	10	13	**3.6**
Canada (Retail)	0	0	0	0	0	0	0	1	1	1	1	1	**0.4**
International (Retail)	0	0	0	0	0	0	0	0	1	2	2	2	**0.6**
Canada (MF)	0	0	0	0	0	0	0	0	0	0	0	0	**0.0**
International (MF)	0	0	0	0	0	0	0	0	0	0	0	0	**0.0**
Canada (Hotel)	0	0	0	1	1	1	1	1	1	1	1	1	**0.5**
International (Hotel)	0	0	0	0	0	0	0	0	0	0	0	1	**0.2**
Source: Own compilation.													**0.5%**

3.5 Methodology

After having specified the relevant variables that are tested in view of the sample, the following sections demonstrate the methods, techniques, and procedures that are applied to the data on REITs and market cycles in line with the purpose of the study to test the hypotheses. The analysis consists of different steps and procedures that are described as follows. First, the characteristics of the sample are analyzed by univariate measures, particularly measures of distribution, and descriptive statistics. Second, the set of techniques that are used to analyze the strength of relationship and time lags are presented. Third, the procedures that are important for analyzing the explanatory power of market cycle factors are specified.

3.5.1 Descriptive Statistics

The aim of descriptive statistics is to convert a mass of raw data into a meaningful form. Also, descriptive statistics are important as a precondition for a quantitative analysis. For example, normal distribution is an important assumption of a regression. Therefore, descriptive statistics are necessary to evaluate the distribution of variables within the sample.[195] Also, the t-test (two-tailed), which quantifies the region of rejection for a hypothesis, for example, with regard to the hypothesis H_0 of correlation between the different factors, using the 0.05 level of significance, is used. Also, the t-values are

[195] The printed version excludes the appendix with the respective tables.

checked. Another key ratio in the context of the regression analysis is the coefficient of determination, which shows the proportion by which the dependent variable can be explained by the independent variable or variables. The Durbin-Watson test is applied to measure autocorrelation. Given the case that returns are uncorrelated, the value of the Durbin-Watson test is 2. Nevertheless, SCHLITTGEN/STREITBERG (2001) stated that the assumption of autonomy is seldom fulfilled in the practical analysis of time series.[196]

3.5.2 Herfindahl Index

The aim of the Herfindahl index is to measure the degree of concentration among positive values. The Herfindahl index ranges from 0 to 1, whereby 1 indicates the highest possible degree of concentration, a monopoly. Consequently, the condition is determined by $\frac{1}{n} \leq H \leq 1$. Similar to other coefficients such as the Gini coefficient, the Herfindahl index is a relative measure of concentration. The Herfindahl index is the sum of the squares of the percentages of the markets held by a firm or firms in a market.[197] The index is applied in various studies related to real estate and qualifies for the identification of the degree of concentration of a REIT or REIT sectors by markets as well as NCREIF regions.[198]

Formula 2: Herfindahl Index

$H = \sum_{i=1}^{n} pi^2$, whereby $p_i = \frac{x_i}{\sum_{j=1}^{n} x_j}$

Source: FAHRMEIER et al. (2007), p. 86.

Normal Distribution

Normal distribution is one of the most widely used continuous probability distributions in statistics and is often the basis for statistical tests, for example, regression analysis. Therefore, the analysis tests the relevant factors by using the Kolmogorov-Smirnov test with corrections by Lilliefors. The Kolmogorov-Smirnov test is used to determine

[196] Cf. SCHLITTGEN, R./STREITBERG, B. (2001), p. 19-21.

[197] Cf. FAHRMEIER, L., et al. (2007), p. 86.

[198] Cf. SCHWARTZ, E.S./TOROUS, W.N. (2007); STANLEY, T.O./LAJAUNIE, J.P./ROGER, C. (2001); YAT-HUNG, C./BO-SIN, T./WING-YU, L. (2001); FORGEY, F.A./MULLENDORE, W.E./ RUTHERFORD, R.C. (1997).

whether two underlying one-dimensional distributions by probability differ or if one underlying distribution from a hypothesized distribution. In this way, the one-sample Kolmogorov-Smirnov test compares the cumulative distribution function with the empirical distribution function specified by the null hypothesis. Since the Kolmogorov-Smirnov test is used for normality testing, the improvements made by Lilliefors, which led to the Lilliefors test, are considered. The results are shown in the corresponding histograms and Q-Q-diagrams for the relevant variables.

3.5.3 Box-Jenkins Cross-correlations

Lagged cross-correlation are applied in time series analysis, particularly signal processing, and many other fields to analyze the relationship between different time series expressed as data points that are typically measured at successive times at normally uniform intervals. Time series analysis comprises different methods that aim to understand time series, relationships between time series, and the underlying context, often with the aim to make forecasts. Observations that are closer in time will often be more closely related than observations that are further apart. Also, the observations will be more likely to derive from past values instead from future values (time-reversibility).

The analysis applies lagged cross-correlations based on the methodology developed by Box-Jenkins (CCF).[199] Cross-correlation can be defined as the correlation between two time series that are not symmetric. In the case when series x_t leads $y_{t,}$ the spikes in the CCF indicate a cross-correlation pointing in one direction and vice versa. The observations of a time series are lagged – positive and negative lags – and correlated with one or more other time series. In this way, cross-correlations contribute to the identification of variables that are preceding indicators of other variables. CCF is a procedure in "trends," which calculates cross-correlations. CCF is widely applied in the analysis of correlations between two signals with different time lags. The maximum (in the case of a positive correlation) determines the exact time lag. Consequently, this methodology helps to analyze the "reaction rate" of one variable on the other. The correlation, in particular within the significant limits, provides information about the strength of the relationship between different factors. As a consequence, lagged cross-correlations can be an adequate procedure to illustrate the reaction of REIT multiples on

[199] Cf. BOX, G.E.P./JENKINS, G.M./REINSEL, G.C. (1994).

a change in occupancy rates, for example. Refer to Table 60 for an example of the calculation of t-values and minimum correlation.[200]

It is necessary to specify the time lags as well as the strength of the relationship. The graphical illustration of the coefficients of the CCF shows the maximum and minimum of the corresponding lagged cross-correlations. As a result, the visualization provides evidence about the s*trength* of relationship and the *type* of relationship. If the coefficient ranges around 0, there is most likely no significant link. On the contrary, if the coefficients are higher than 0.35 and in the significant area, there is most likely a significant link.

When investigating time series, observations of a time series are often time-delayed and auto-correlated. This means that there is a relationship between the different observations that is influenced by past observations. For example, rent levels of one year range from $10 to $20, but rent levels from one month to the other month will range more likely between +/- $2. If there is a certain relationship, there is most likely auto-correlation (first order). Moreover, there can be auto-correlation between T1 and T3, for example. While auto-correlation refers to the correlation within a time series, cross-correlation refers to the correlation between time series. Consequently, it is an analysis "in trends."

In time series, cross-correlation refers to covariance (cov(X,Y)) between the two random vectors, distinguished from the "covariance" of a random vector. This is understood to be the matrix of covariance between of the scalar part of this vector. In signal processing, the CCF, also called the cross-variance, measures the similarity of two different signals in order to find links in an unknown signal by comparing it to a known one. In this way, it is a function of the time between the different signals that have applications pattern recognition and cryptanalysis.

Formula 3: Cross-correlation for f_i and g_i in a discrete function

$$(f \star g)_i \stackrel{\text{def}}{=} \sum_j f_j^* \, g_{i+j}$$

Source: BOX/JENKINS/REINSEL (1994), p. 434 et seqq.

[200] Refer to Table 60, p. 312.

Formula 3 shows the sum over the appropriate values of the integer j. Similarly, Formula 4 shows the cross-correlation for continuous functions. In this light, cross-correlation is similar to the convolution of two functions. Nonetheless, correlation involves the reversion of a signal, shifting it and then multiplying it with another signal whereas convolution involves multiplying, not reversing, and shifting it.

Formula 4: Cross-correlation for continuous functions

$$(f \star g)(x) \stackrel{\text{def}}{=} \int f^*(t)g(x+t)\,dt$$

Source: BOX/JENKINS/REINSEL (1994), p. 234 et seqq.

In the case when two real functions f and g differ only by their shift along the x-axis, it is possible to calculate the CCF in order to investigate how much the second variable has to be shifted so it is identical with f. This means that the value of the function of the two variables is maximized when both match. The reason is that when the lumps, the positive areas, are aligned both contribute to making the integral larger. If the negative areas align, this also contributes positively to the integral because the product of f and g is then positive.

The statistical software package SPSS uses the following notation to describe the algorithm that is applied:

- X, Y Any two series of length n
- $r_{xy}\,(k)$ Sample cross correlation coefficient at lag k
- S_x Standard deviation of series X
- S_y Standard deviation of series Y
- $C_{xy}\,(k)$ Sample cross covariance at lag k

Formula 5: Estimation Cross-correlation Coefficient at lag k

/ where

$$C_{xy}(k) = \begin{cases} \frac{1}{n}\sum_{t=1}^{n-k}(x_t - \bar{x})(y_{t+k} - \bar{y}), & k = 0,1,2,\ldots \\ \frac{1}{n}\sum_{t=1}^{n+k}(y_t - \bar{y})(x_{t-k} - \bar{x}), & k = -1,-2,\ldots \end{cases}$$

Source:

BOX/JENKINS/REINSEL (1994), p. 234 et seqq.

The standard error is based on the assumption that the series are not cross-correlated and one of the series is white noise, as shown in Formula 6 below.[201] Strictly speaking, both variables have to be normally distributed, which is normally the case only with very large samples. Therefore, it is investigated if the variables by themselves are normally distributed.

Even if this is not the case, the test for significance on the 5% and 1% levels is "exceedingly robust in terms of violation of the normal distribution assumption as well as in terms of the preconditioned, scaled interval level."[202] Therefore, the minimum significant coefficient and t-values are calculated for every CCF analysis.

Formula 6: Approximation of Standard Error

$$se\left(r_{xy}(k)\right) \cong \sqrt{\frac{1}{n-|k|}}, \quad k = 0, \pm 1, \pm 2, \ldots$$

Source: BOX/JENKINS/REINSEL (1994), p. 234 et seqq.

Multivariate time series analysis is the dynamic analysis of relationships between variables. While common correlation does not give an indication about the direction of the effect of one variable on the other, dynamic time series analysis is able to make hypotheses about cause-and-effect directions. Consequently, if the correlation is different from 0, this does not provide evidence if Vp influences Vp or vice versa. Therefore, asynchronous cross-correlations are of importance although they cannot necessarily give indications about the feedback effect. However, ARIMA models can investigate the dynamic relationships between variables.

By lagging the first variable by k periods, this variable is the lead-series and vice versa. The serial dependencies of the internal structure of the variables, auto-correlation, can influence the time series and lead to a spurious correlation that limits the determination of causality. Possible solutions are the Bartlett test, that is a test for significance that includes serial dependencies, or "prewhitened" cross-correlations that filter the serial dependencies from the univariate time series to produce white noise. The term prewhitened means that white noise is not the end of the procedure but a precondition and starting point for the cross-correlation.

[201] The general formula for the standard error can be found in BOX, G.E.P./JENKINS, G.M./REINSEL, G.C. (1994), p. 376.

[202] Cf. BORTZ, J. (1999), p. 205.

Since certain patterns of cross-correlations are characteristic of cross-correlations, the Pierce-Haugh test tests the cross-correlations for significance. Nevertheless, prewhitening involves certain complications, which can lead to incorrect results, for example, misinterpretation by not including other variables. In addition to the problems associated with determining a *causal* relationship, the CCF analysis is useful in determining the strength of the relationship and time lags in the context of a *forecast* model.

3.5.4 Multivariate Regression Analysis

The multivariate regression analysis aims to model and analyze the effect of space markets, sales, and earnings factors as independent or explanatory variables on earnings and pricing factors as dependent variables (response variable).[203] Pricing of REITs in terms of FFO multiples and stock price changes is modeled as a function of the aforementioned factors, the corresponding parameters, and the error term.

In line with the research objective, the regression analysis aims to give the best fit for space market factors to explain FFO changes, for example, by using the least squares method. In this context, the basic thesis statement or question is whether there is a significant relationship between the factors.[204]

In this way, the regression analysis tests the required assumption such as the probability distribution of the errors. Important underlying assumptions are as follows:

- Sample must be representative of the population.
- Independent variables are error free.
- Predictors must be linearly independent (no multicollinearity).
- Variance of the errors is constant (homoscedasticity).
- Residuals are normally distributed.

Based on these assumptions, the regression analysis tests whether there is a linear relationship, meaning that the dependent variable, e.g., FFO multiple in quarter three, is a linear combination of the parameters, e.g., rental growth rates of the respective REIT

[203] Refer to Chapter 3.3, p. 75. Due to the different layers of the analysis, FFO is a dependent variable analyzing the effect of space market factors on operating performance as well as an independent variable used to explain the pricing of REITs.

[204] Cf. AUER, L. (2007), p. 13.

in quarters 1 to 3 of the same year. Consequently, the analysis is a multivariate regression that takes into account several predictive variables simultaneously.

In particular, the analysis investigates the predictive power measured by "R-Square" and "adjusted R-Square," significance of the whole model (F-Values and significance in the ANOVA), "T-Values" and significance of the coefficients of the respective predictors, and "Beta-Values" and standard error in addition to the assumption of the regression model itself. Furthermore, the analysis also uses "stepwise" regression analysis to find out the most important predictors.[205]

In the context of a regression analysis, endogenous means or refers to the relationship between the predictors (independent variables) and the error term. If the independent variables correlate with the error term, this an indication for an endogenous link. This means that the covariance of the predictors is unequal, 0. It is important that the independent variables are not endogenous to not bias the coefficients and significance. A possible test to control for this aspect is the Hausman test. Also, there can be overfitting (too many variables) and underfitting (important independent variables are missing).[206]

Regression analysis is one of the most commonly used statistic techniques to *predict* and *forecast* time-series data, hypothesis testing, and modeling of causal relationships. Therefore, regression analysis is chosen as a method to analyze the predictive power of space market fundamentals (and "Sales" as a control factor) for FFO (changes) and pricing of REITs.

Formula 7: Regression Model

$$\begin{aligned} FFO\_\Delta_t = {} & \beta_0 + \beta_1 Rent\_\Delta_t + \beta_2 Rent\_\Delta_{.k-1} + \beta_3 Rent\_\Delta_{.k} + \beta_4 Rent\_\Delta_{.k+1} + \\ & \beta_5 Occup\_\Delta_t + \beta_6 Occup\_\Delta_{.k-1} + \beta_7 Occup\_\Delta_{.k} + \beta_8 Occup\_\Delta_{.k+1} + \varepsilon_t \end{aligned}$$

Note: "Δ" stands for change. "k" is the quarterly time lag. "T-Bill" is the three-month T-Bill rate, "ConsConf" is the change in Consumer Confidence, "HousMarkIndex" is the Housing Market Index, "PersInco" is the change in personal income, "Popu" is the change in population, "Empl" is the change in employment of nonfarm industries, "CPI" is the consumer price index, and "TreaBond" is the change in the 10-year Treasury bond.

Source : SNL REAL ESTATE, PFEFFER.

[205] Cf. Ibid., p. 19.

[206] Cf. Ibid., p. 453.

The model above illustrates the regression model. The equation always includes the space market factors of the present quarter (first line) and the same macroeconomic control variables for each REIT property-type sectors. The second and third lines include three lagged space market quarters of the corresponding factor that are based on the results of the CCF/lag analysis. Since these lags are different for every sector, the exact quarterly lag (k) is specified for each sector separately. The regression model for the pricing of REITs is the same, only differing by the dependent variable (stock price change).

Overview

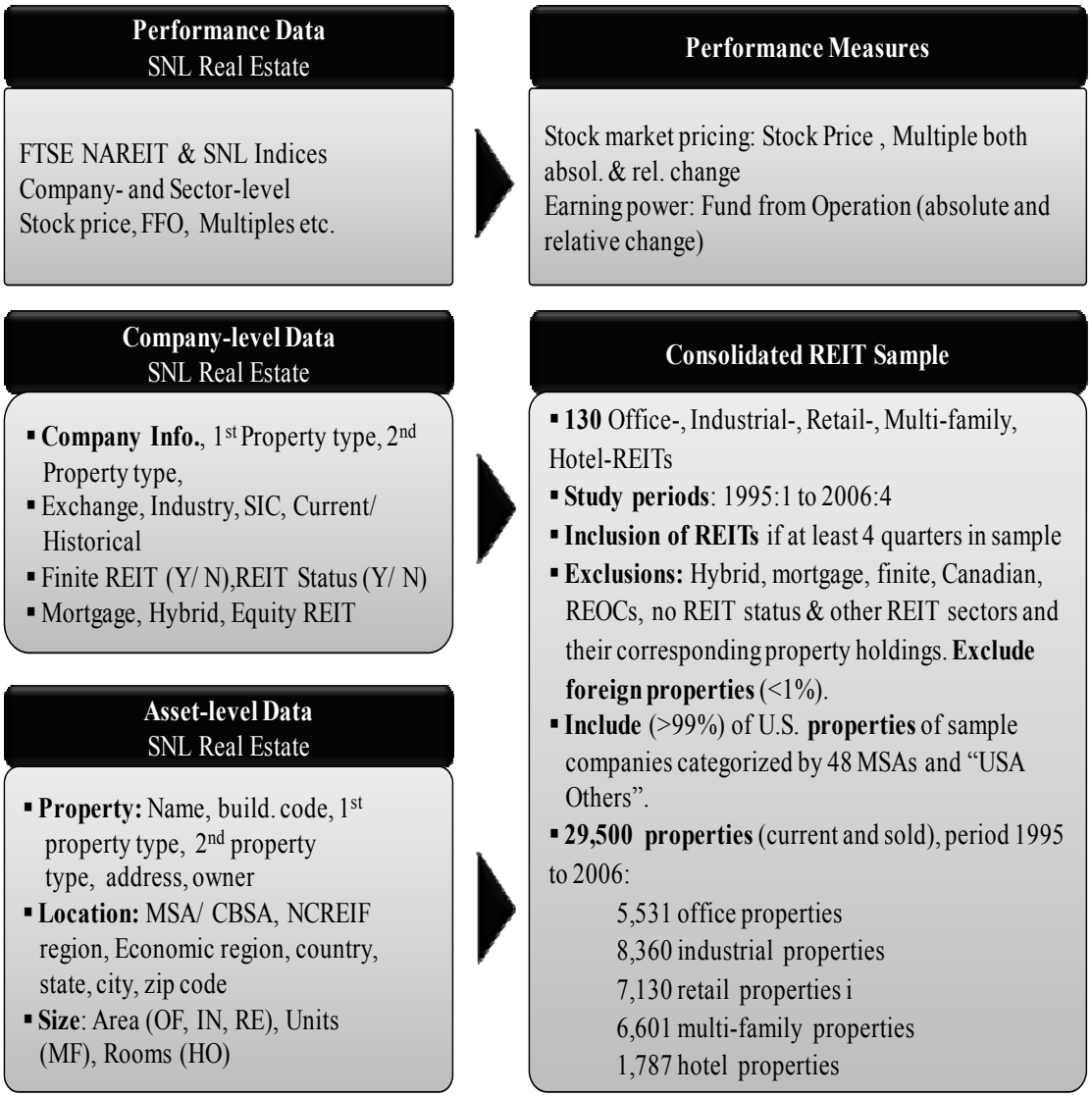
As shown in Table 13, the data sample resembles an accurate, complete, and detailed long-term overview of the property holdings of individual REIT companies and sectors accordingly. As described, REIT-level data and asset-level data had to be retrieved separately. Then, information on REIT-owned properties and space market factors of the five property types had to be merged with the appropriate companies in line with the purpose of the study.

As shown, the analysis uses two different types of (space market) performance measures (absolute levels and relative change). Although relative change is the more correct measure to compare different REIT property type sectors, absolute levels, for example rent per unit is usually applied in practice.

Then, the metro-area classification by PPR had to be slightly adapted to the classification by SNL Real Estate. Precisely, six relatively small metro areas (measured by market size) are included in larger metro areas in SNL Real Estate, for example, “Fort Lauderdale” is part of the “Miami – Fort Lauderdale – Pompano Beach” metro area in SNL Real Estate.

Looking at the property holdings of REITs, the sample covers nearly the complete holdings of REITs. Also, the absolute number of properties with around 30,000 is relatively high in the context of the investable stock of commercial real estate in the United States.

Table 13: Overview of Data Sources and Sample Consolidation



Source: SNL REAL ESTATE, PFEFFER.

Altogether, the empirical analysis includes 29,868 data sets on REIT-owned properties. (The original sample included 64,630 data sets on REIT-owned properties.) Following SNL Real Estate that the database is complete for the period of investigation,[207] the consolidated sample contains more than 99% of the relevant properties of the respective REIT sectors and 46% of all properties held by North American REITs and REOCs for the relevant period. Next, the following section explains the methodology and techniques applied in the empirical investigation.

[207] Cf. SNL (2007a), no page.

4 Findings

4.1 Fundamental Analysis of Real Estate Investment Trusts

The aim of the present chapter is two-fold: analyze the characteristics of the sample and perform a fundamental analysis. Before analyzing market cycles of REITs, it is necessary to investigate the basic facts and principles underlying the assets of REIT sectors and companies involved in this study. In this way, the following fundamental characteristics and ratios of REIT sectors are analyzed over the study period:

- Market Capitalization of REITs
- Total Debt to Total Market Capitalization of REITs
- Gross Real Estate Investments to Assets of REITs
- Real Estate Investment Growth of REITs
- Funds from Operation Growth of REITs
- Funds from Operation to Revenue of REITs

The fundamental analysis focuses less on price or performance, which is investigated in chapter4.1, and more on factors that are essential to indicate whether REIT prices are consistent with the underlying fundamentals and how these factors have changed during the period 1995 to 2006. The fundamental analysis assumes that markets are imperfect, that information is not instantaneously assimilated or disseminated, and that econometric models can be constructed to generate equilibrium prices.[208] Therefore, factors that are considered important to the understanding of the underlying assets of REITs are presented here. Due to the large number of REIT companies in the sample, this chapter illustrates only key fundamentals of REIT property sectors, not companies.

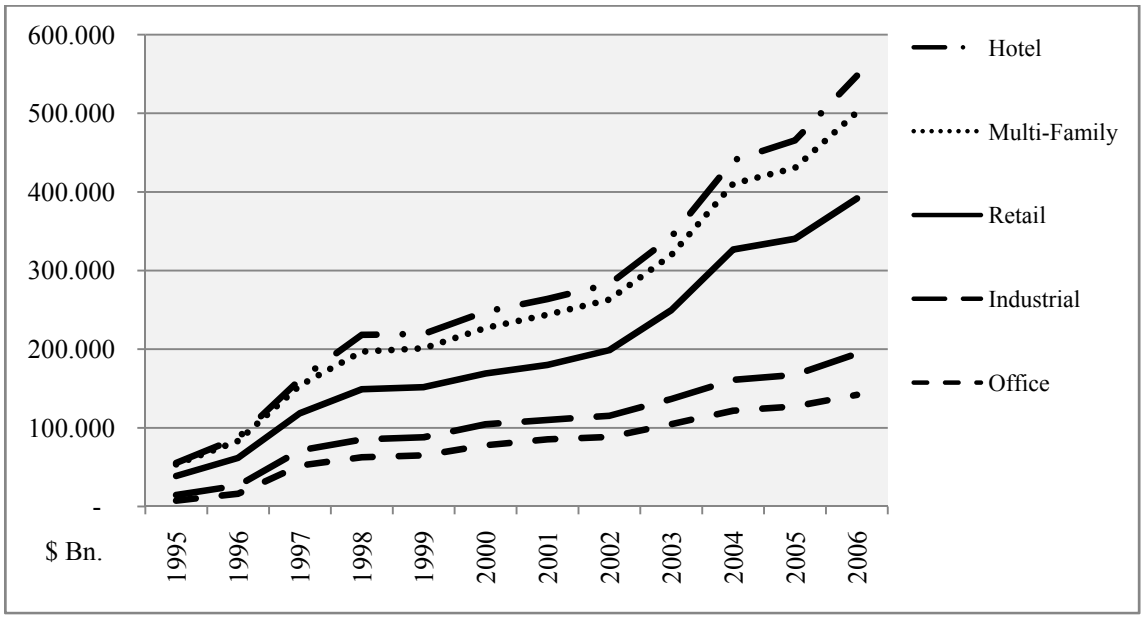
4.1.1 Market Capitalization of Real Estate Investment Trusts

Starting with the market capitalization of REIT sectors that is defined as the value of the company's common stock at the end of the financial period (calculated as “all classes of Common Shares Outstanding * Price per Share at end of period”), Figure 16 illustrates the continuous increase in market capitalization over the study period. The figure shows that the market capitalization has increased from about $50 billion to more than $500

[208] PRINCETON (2007), no page.

billion in 2006, which accounts for an average increase in market capitalization of more than $40 billion per year.[209] In contrast to the preceding chapter, "size" is not measured by the size of the underlying assets but by the value of the shares. The following chart shows the total capitalization of the five sectors. For example, Office REITs contributed $140.5 billion in 2006 to this amount.

Figure 16: Accumulated Total Market Capitalization of REIT Property Sectors



Source: SNL REAL ESTATE, PFEFFER.

Looking at the relative share of the five REIT sectors analyzed, Figure 17 illustrates that allocations have remained relatively stable apart from the years before 1997. Since market capitalization is defined as the product of shares and stock price, changes in market capitalization can have different reasons. For example, the decreasing market capitalization of OF-REITs and HO-REITs in 2001 may have been caused by an undervaluation of office and hospitality real estate after the events of September 11, 2001, in comparison to the other REIT sectors.[210] On the other hand, the capitalization of OF-REITs increased at a higher rate from 1995 to 1998, due to the large number of IPOs in the office sector[211] and the favorable valuation of listed office real estate because of the good property fundamentals caused by an increased demand for office

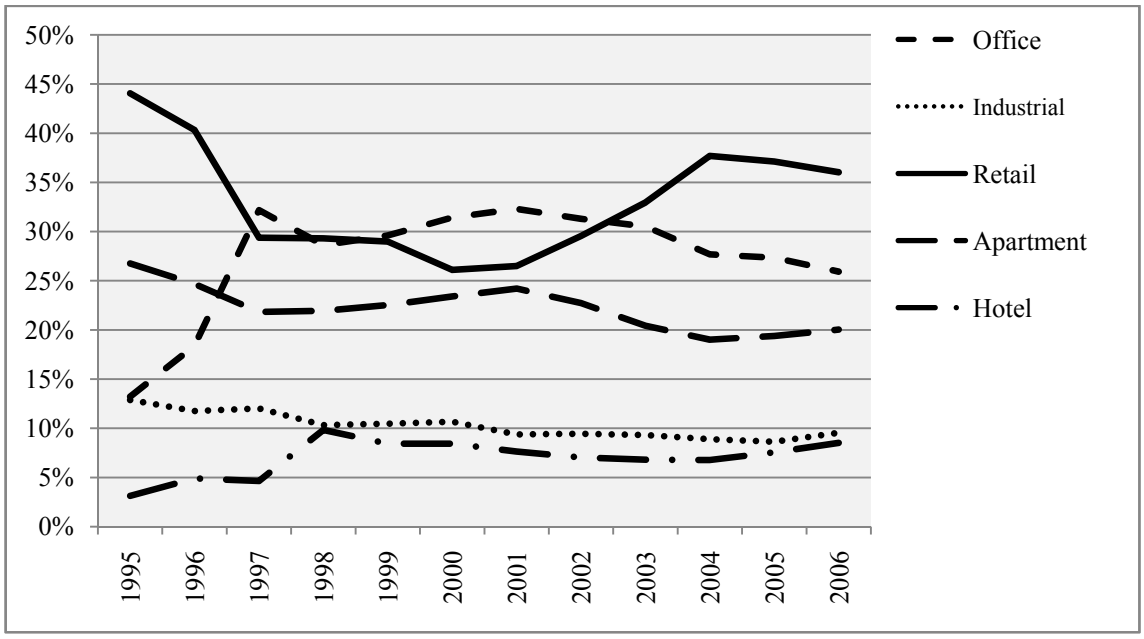
[209] The capitalization calculated refers to the sample only and may be different to other representations.

[210] Cf. DERMISI, S.V. (2007); MILLER, N.G., et al. (2003); ANONYMOUS (2001b), no page.

[211] Cf. SHELOR, R.M./ANDERSON, D.C. (1998), p. 375 et seq.

space by the New Economy companies. These factors also boosted the pricing of OF-REITs, which resulted in a higher market capitalization.[212]

Figure 17: Pro-rata Market Capitalization of REIT Property Sectors



Source: SNL REAL ESTATE, PFEFFER.

4.1.2 Total Debt to Total Market Capitalization of Real Estate Investment Trusts

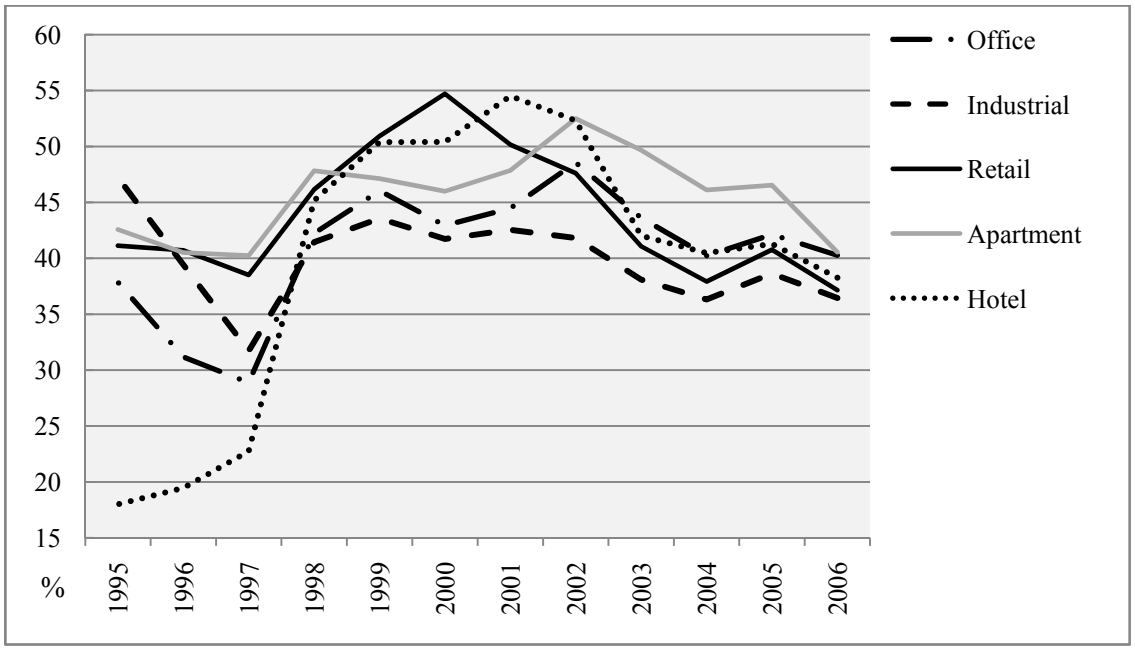
The total debt to total market capitalization (as a percentage of "Common Capitalization" + "Total Preferred Equity" + "Total Debt" + "Mezzanine" – "Minority Interest") is an important measure of leverage.[213] The total-debt-to-total-market-capitalization ratio (expressed as the non-weighted average of all REITs in the sample) gives an indication of the long-term financial structure of a business. In this way, Figure 18 gives several insights into the leverage structure of the REITs in the sample. First, Equity REITs generally have a relatively low leverage ratio (below 50% most of the time). Second, the leverage ratios have been more synchronized since 1998. Third, Hotel REITs seem to have the lowest degree of leverage in the sample. Due to the more cyclical nature of Hotel REITs, this might be because they cannot afford such high leverage. Altogether, the illustration demonstrates the conservative capital structure of

[212] Cf. SIVITANIDES, P.S./TORTO, R.G./WHEATON, W.C. (2004); HESS, R./LIANG, Y. (2003a); YOON, D., et al. (1999), p. 70.

[213] Cf. SNL (2007b), no page; INVESTORWORDS (2007a), no page.

REITs. Since this ratio is subject to two factors (debt and capitalization), the increase in 1998 is probably subject to the negative price change of REITs during this year that decreased the total market capitalization.[214] The long-term average over the study period over all five sectors (not weighted by market capitalization of sectors) was approximately 42%.

Figure 18: Total Debt to Market Capitalization – Sample REIT Sectors



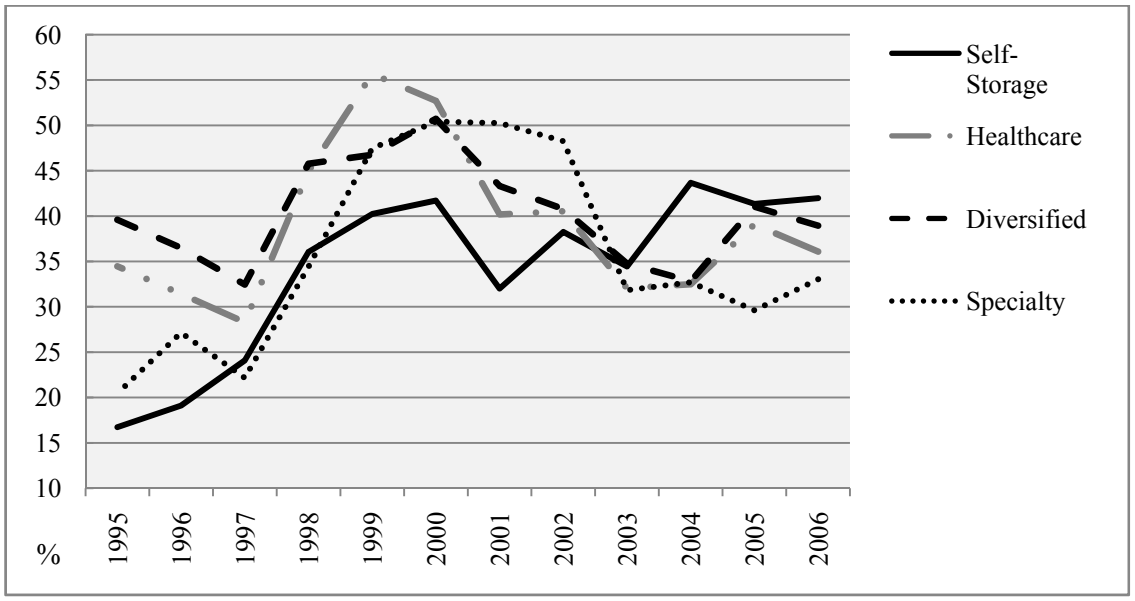
Source: SNL REAL ESTATE, PFEFFER.

Comparing the leverage ratio of the five "traditional" REIT sectors with the "non-five food groups," Figure 19 shows that the other sectors are more volatile. Nonetheless, the overall direction of the total debt to total market capitalization is similar to the other five sectors. Hereby, Healthcare REITs had the highest maximum leverage with around 56% in 1999. Altogether, all REIT sectors have increased their leverage from 1995 to 1999, reflecting the price changes during this period (and changing debt levels). With an average of 40% for all sectors, it is demonstrated that REITs have a relatively low degree of leverage. Having a basic understanding of the capital structure of REITs is important to put the results of the later analysis into perspective. In a completely efficient stock market, the value of a REIT should be determined only by the earning potential and the risk of the underlying properties and does not depend on financing. In reality, REITs can increase their FFO yield by simply changing their capital structure

[214] Refer to Chapter 4.1, p. 115.

(increasing debt), which makes the company more risky. Therefore, it is important to take the degree of leverage into consideration when evaluating the performance of REITs and conceive the two basic factors that determine the value of REIT equity: the market's view of the long-term earnings growth prospects and the investor's required return on the firm's equity.[215]

Figure 19: Total Debt to Market Capitalization − Other REIT Sectors



Source: SNL REAL ESTATE, PFEFFER.

4.1.3 Gross Real Estate Investments to Assets of Real Estate Investment Trusts

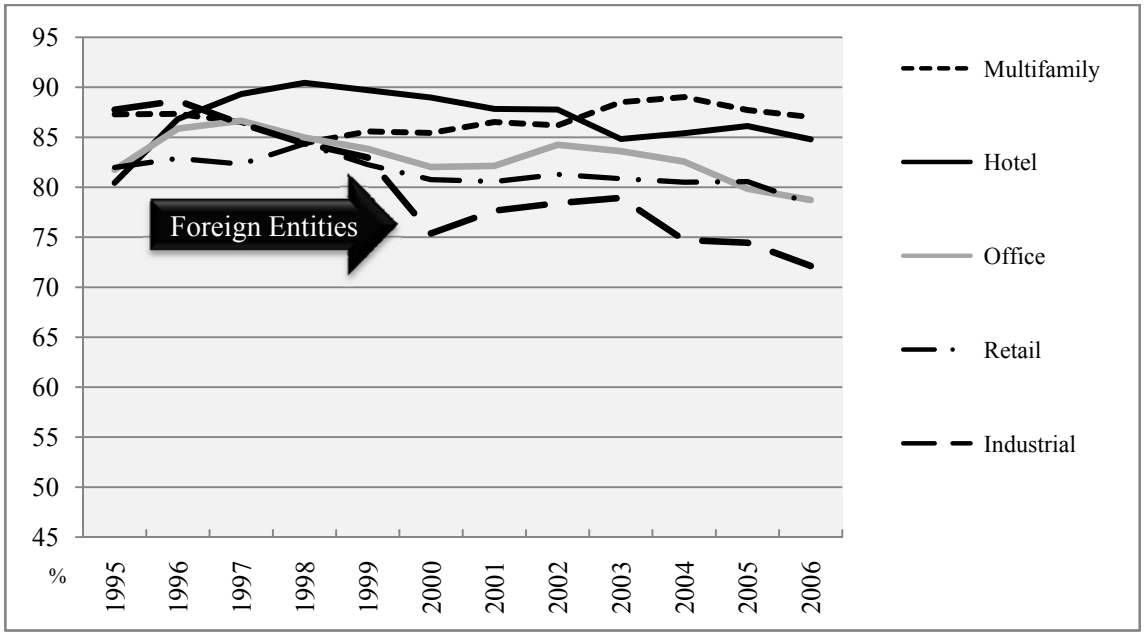
The gross-real-estate-investment-to-assets ratio is an important indicator in the analysis because the ratio illustrates the degree by which REITs are actually invested in real estate. The following diagram illustrates that this ratio has not remained constant over time and that REIT sectors have moved into different directions during the 12-year study period. Since the dissertation aims to analyze the link between market cycles, real estate assets, and REIT performance, it is inevitable to specify and investigate the proportion by which REITs are invested in real estate.

Taking into consideration that the balance sheet is composed of other assets such as cash and cash equivalents, furniture, fixtures, or investments in affiliates, Table 24 shows that REITs are almost completely invested in real estate. The diagram also shows

[215] Cf.GELTNER, D., et al. (2007), p. 602.

that the properties-to-assets ratio has decreased for IN-REITs during the last six years. Changes in the properties to asset structure can have different reasons, e.g., from the sale of properties, after raising capital, from a low dividend payout ratio or if a REIT is not able to invest the funds available in new buildings. Altogether, the diagram reveals a mixed picture regarding the development of the properties-to-assets ratio. For example, while Apartment REITs have increased their ratio, OF-REITs have experienced a decrease.

Figure 20: Properties to Assets – Sample REIT Sectors[216]



Source: SNL REAL ESTATE, PFEFFER.

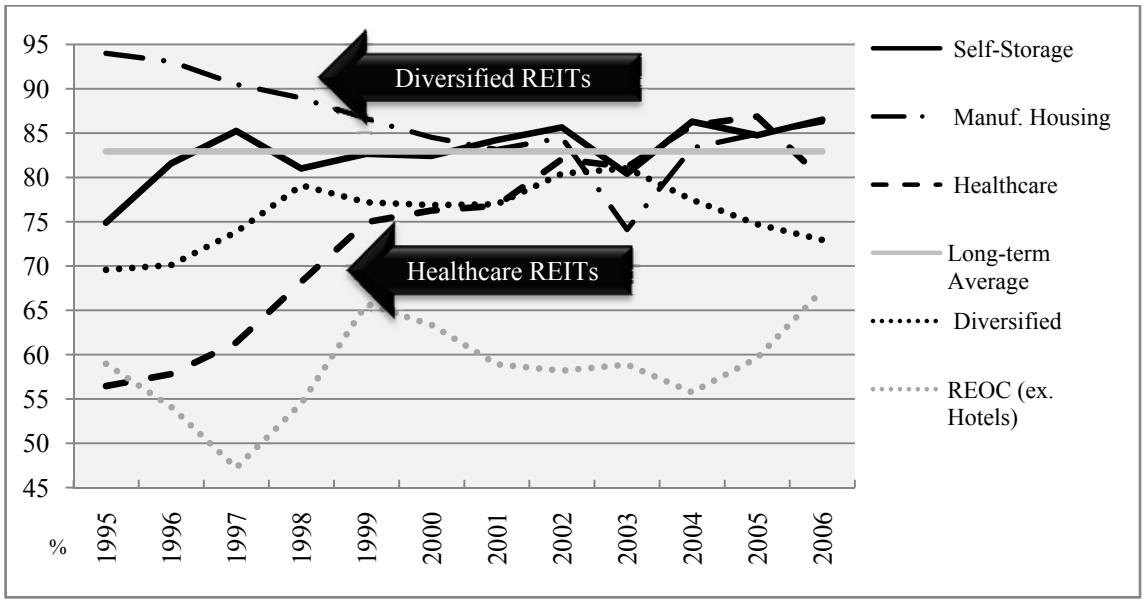
This may have been caused by the severe competition for office properties reflected in a stiff yield compression, increasing the price for office buildings. In addition to the Industrial REIT sector, all four other sectors typically have ratios ranging between 80% and 90% over the study period, in most cases above the long-term average of EQ-REITs. At this, the decreasing percentage of the Industrial REIT sector is due to the fact that the two largest Industrial REITs (AMB Properties Corporation and ProLogis) have increased their foreign holdings that are shown as foreign entities instead of properties. This trend continues as ProLogis announced a $14 billion fund launched in Europe, Mexico, and South Korea.[217]

[216] The aggregates are size weighted, calculated by consolidating all companies into a single entity.

[217] Cf. PROLOGIS (2007a), no page.

Again, analyzing other REIT sectors and REOCs reveals a different picture. Typically, REOCs have lower properties-to-assets ratio than REITs. Nonetheless, Figure 21 points out that the non-traditional REIT sector is not only more volatile in terms of properties to assets but are also less invested in real estate, trading under the long-term average of Equity REITs most of the time (LTAv is 82.9%). Notably, diversified REITs have continuously increased their property investments in relation to assets. Amazingly, the properties-to-assets ratio of Healthcare REITs increased from around 55% to more 85% in 2005. This means that Healthcare REITs have increased their real estate share, which might be in connection with the changing structure of the healthcare industry.[218]

Figure 21: Properties to Assets − Other REIT Sectors and REOC



Source: SNL REAL ESTATE, PFEFFER.

4.1.4 Real Estate Investment Growth of Real Estate Investment Trusts

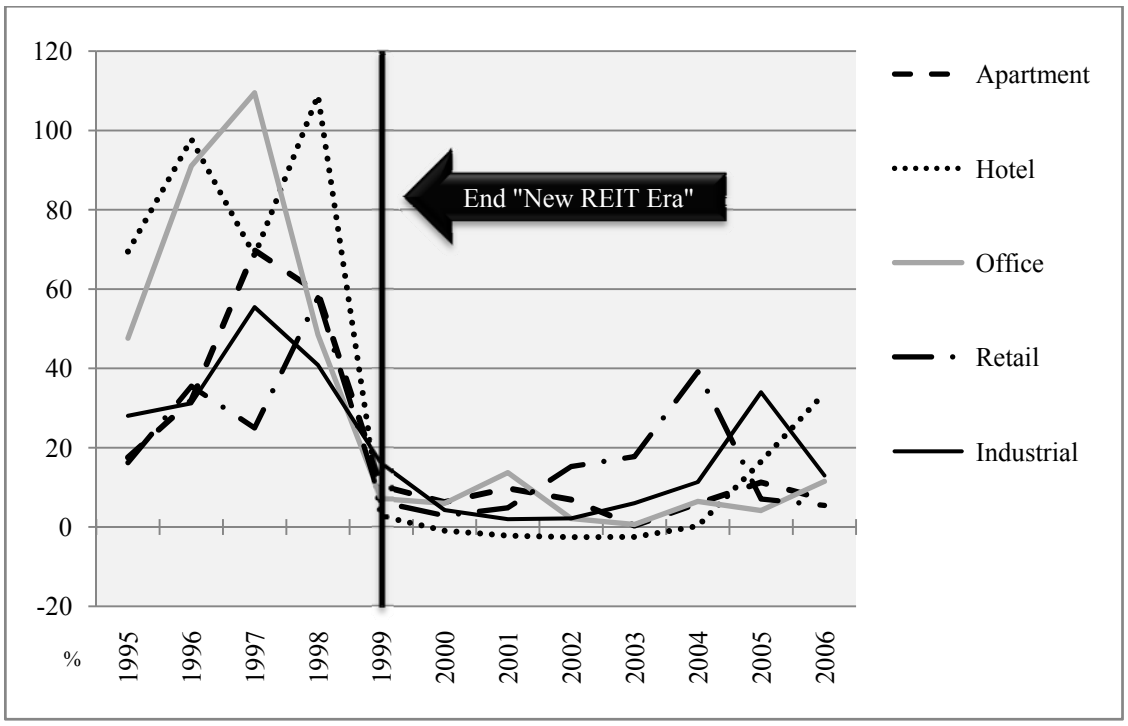
Real estate investment growth is an important parameter in the evaluation of REIT growth because real estate investment growth specifies the amount of real estate assets that are added to (or subtracted from) the portfolio. During the "New REIT Era,"[219] REITs experienced rapid growth primarily from firm-level investments and not from

[218] Cf. ANIKEEFF, M.A., et al. (2007), p. 355.

[219] The New REIT Era started in 1992/93 and ended in 1999 (The Old REIT Era is a synonym for the period 1981 to 1992).

new entries.[220] Firm-level investments depend heavily on financing by equity and debt, with little reliance on retained earnings. In this light, REITs can create value for investors only by growing their real estate investment base if they provide returns above their costs of capital.

Figure 22: Real Estate Investment Growth − Sample REIT Sectors



Source: SNL REAL ESTATE, PFEFFER.

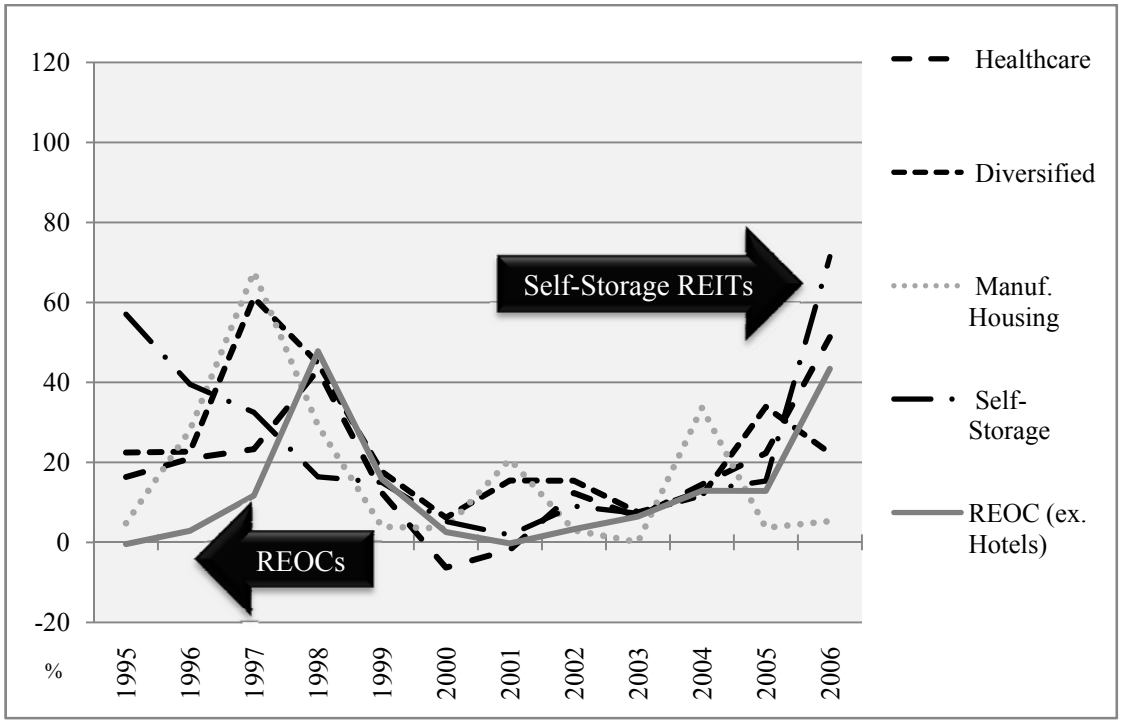
The stellar real estate investment growth of REITs during the New REIT Era is shown in Figure 22. From dissecting the different lines, it becomes obvious that all five REIT sectors experienced tremendous growth during the New REIT Era (1992 to the end of 1998). Nonetheless, the growth rates differ for the respective REITs and across REIT sectors. Looking at the period after 1999, RE-REITs grew their investment base at the highest rate until 2004, followed by IN-REITs. Although having the lowest growth rate during the period 1999 to 2004, HO-REITs started to accelerate their pace of growth at a rate of more than 15% in 2005 and more than 30% in 2006. In summary, the five REIT sectors have been able to achieve a positive real estate investment growth rate over the whole sample period (apart from AP-REITs with a lateral movement during

[220] Cf. OTT, S.H./RIDDIOUGH, T.J./HA-CHIN, Y. (2005), p. 203.

1999 to 2004). Since only a few industries can claim a decade of positive investment growth, this alone is an impressive fact.

Comparing the sample REIT sectors with the other REIT sectors and REOCs, Figure 23 resembles the previous diagram with the difference that Self-storage and Healthcare REITs had higher real estate investment growth rates than the other sectors. Moreover, the diagram shows that REOCs were not able to keep pace with REITs in terms of average real estate investment growth rates (average yearly growth rate: 13.25%). To conclude, the investigation of real estate investment growth demonstrates the different growth phases of REITs in terms of real estate investments in the New REIT Era (1992/93–1999), a period of relatively low growth rates until 2003 and a new growth momentum between the end of 2003 and 2006.

Figure 23: Real Estate Investment Growth − Other REIT Sectors and REOCs



Source: SNL REAL ESTATE, PFEFFER.

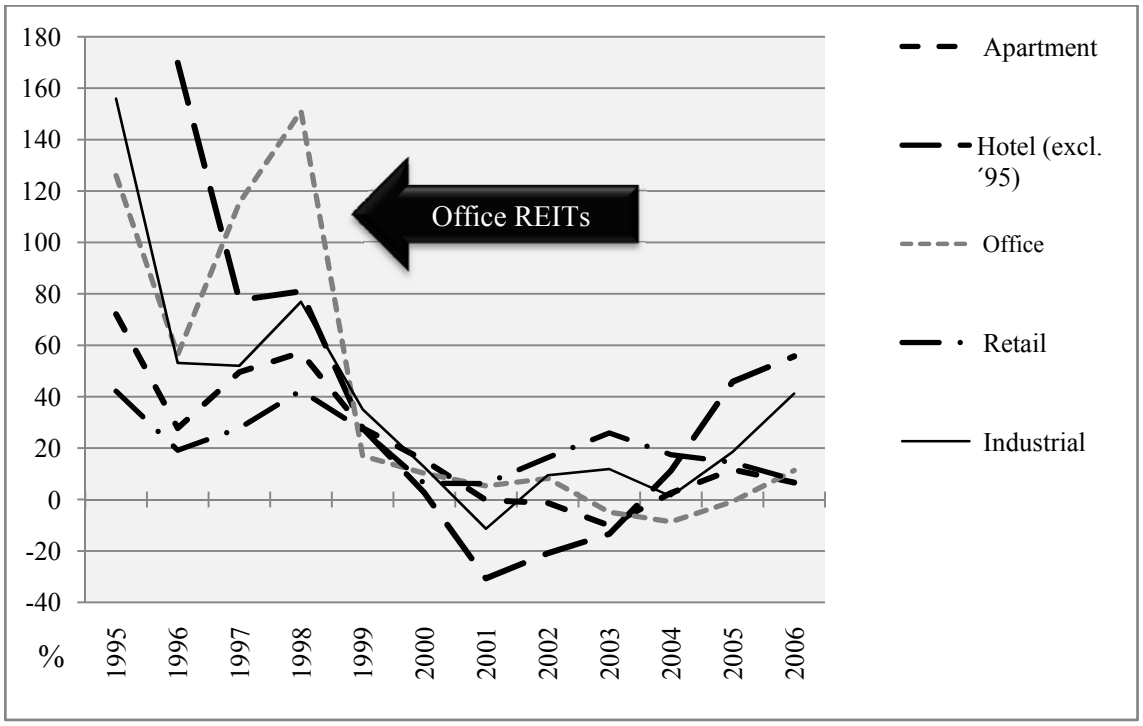
4.1.5 Funds from Operation Growth of Real Estate Investment Trusts

Having analyzed the real estate investment growth of REITs, it is essential to take into consideration that asset growth is not automatically synonymous with FFO per-share

growth.[221] At this, FFO growth is important because it has a direct impact on the FFO multiple of a REIT because standard financial theory states that company earnings growth should be reflected in stock price increases. Consequently, FFO multiples should increase if REITs increase FFO per-share. REITs can increase FFO either internally, for example, by increasing rents or improving occupancy rates or externally through acquisition of properties, portfolios, or mergers and acquisitions.

Figure 24 shows the growth rates of REIT sectors. Equity REITs increased FFO by 24.4% per year over the whole 12-year period of investigation. The FFO growth was higher during the New REIT Era when REITs increased their asset base (as illustrated in the previous sections), which is mirrored in positive earnings growth. Noticeably, only Hotel REITs had a period of negative FFO growth during 2001 and 2003. This can be explained by an exogenous shock, the event of September 11, 2001, that hit the hospitality industry and Hotel REITs accordingly.[222]

Figure 24: FFO Growth − Sample REIT Sectors



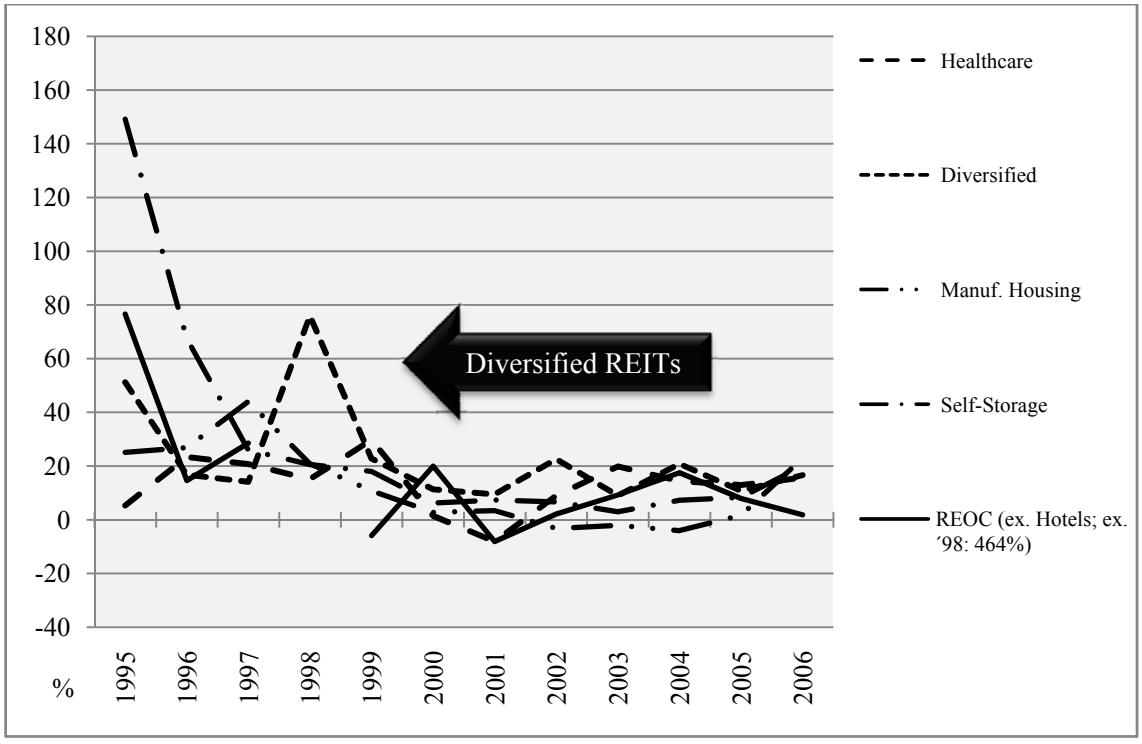
Source: SNL REAL ESTATE, PFEFFER.

[221] Cf. MUELLER, G.R. (1998), p. 149-150.

[222] Cf. ANONYMOUS (2001b), p. 14.

After this period of negative FFO growth, HO-REITs recovered with strong fundamentals and outperformed the other sectors in 2005 and 2006.[223] Also, Office REITs grew their FFO by 150% in 1998, which may be caused by increased property acquisition in conjunction with record rent levels that contributed to higher earnings. Comparing the real estate investment growth with the FFO growth, the results indicate that real estate investment growth is at least correlated. In this way, the analysis does not differentiate between different real estate investment growth strategies such as portfolio versus individual properties acquisition.

Figure 25: FFO Growth − Other REIT Sectors and REOCs



Source: SNL REAL ESTATE, PFEFFER.

Comparing the FFO growth of the five sample REIT sectors with the other REIT sectors/REOCs shows that the second group of REIT sectors did not grow FFO by more than 20% after the New REIT Era. Moreover, the other REIT sectors and REOCs did not increase FFO to the same extent as they grew their asset base. For example, Self-storage REITs increased their real estate investments by 70% in 2006 but increased FFO by only 20%. This illustrates that asset growth is not always synchronic with FFO growth. Diversified REITs increased FFO higher than the other sectors in 1998 because

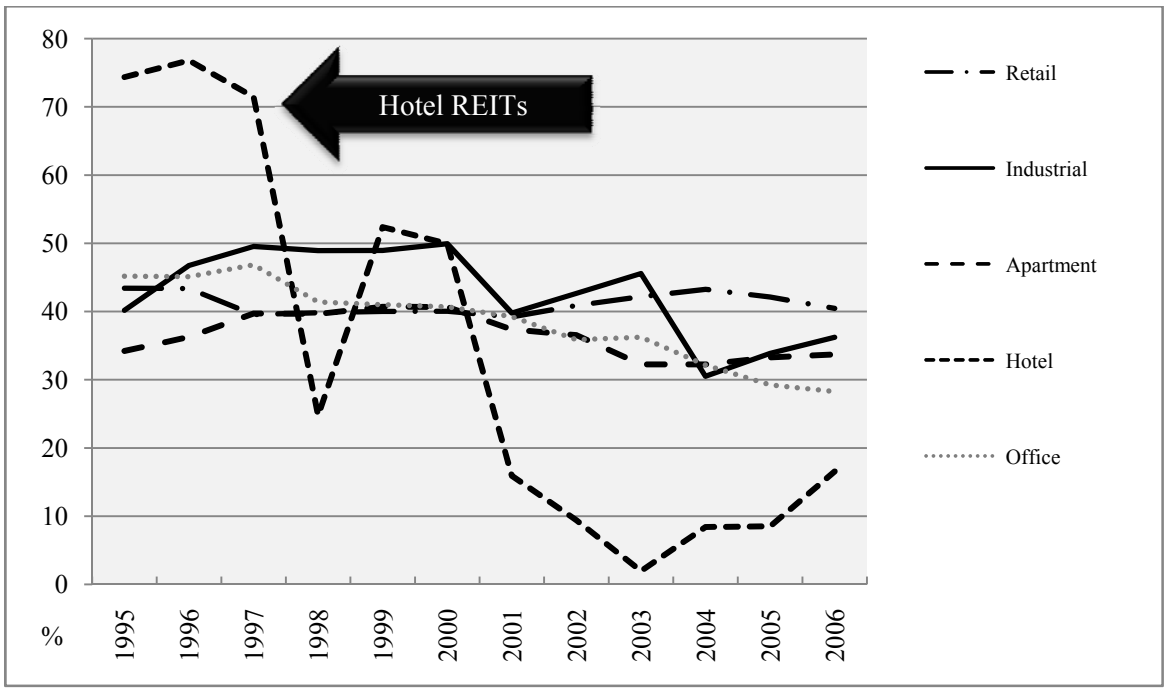
[223] Cf. DELA CRUZ, T. (2005), p. 30-31.

most Diversified REITs – in particular, the largest Diversified REIT, the Vornado Realty Trust – have a large share of office properties. Therefore, the FFO growth is similar to the FFO growth of the Office REIT sector.

4.1.6 Funds from Operation to Revenue of Real Estate Investment Trusts

Since FFO is the key performance indicator in the following performance analysis, it is necessary to analyze the relationship between FFO and Revenue. Since FFO includes the effect of depreciation and gains (losses) from sales of facilities (and adjustments for unconsolidated partnerships and joint ventures), which are based on historical costs, it is of relevance in evaluating current performance; REITs have a certain amount of flexibility regarding FFO earned. This means that the FFO-to-revenue ratio can change from year to year, as shown in Figure 26.

Figure 26: FFO to Revenue − Sample REIT Sectors



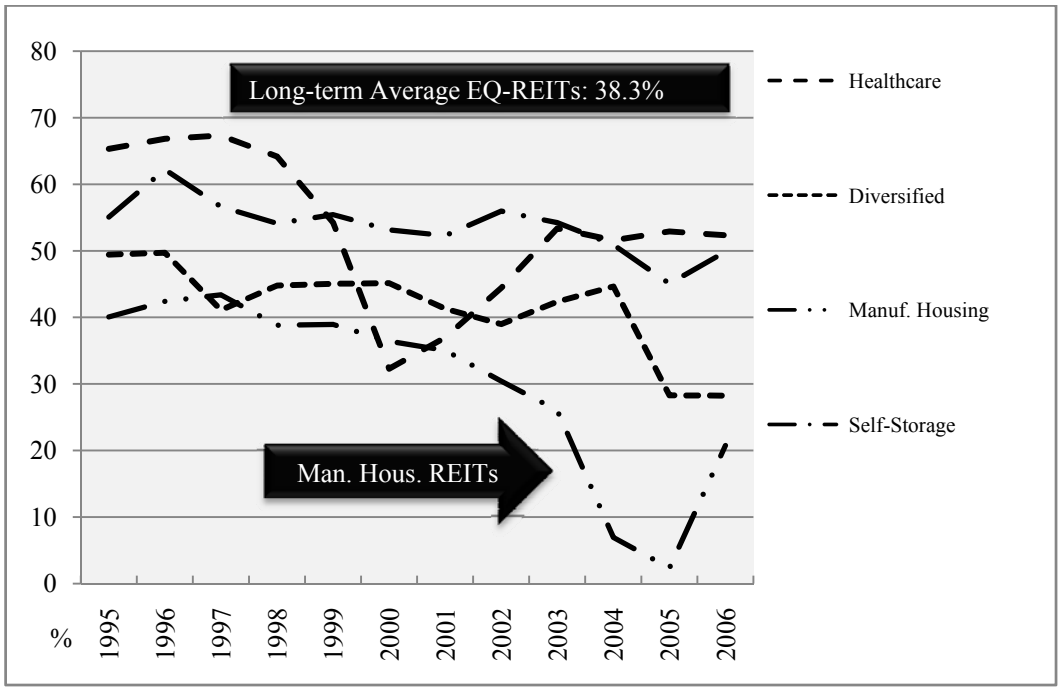
Source: SNL REAL ESTATE, PFEFFER.

While the long-term average of Equity REITs is 38.3%, Hotel REITs demonstrate the highest volatility in FFO to revenue from nearly 80% to close to 5% in 2003. Nonetheless, most REITs range between 30% and 50% (in FFO to revenue growth). In this way, FFO to revenue is a firm-level measure and represents the levered equity operating income. The FFO-to-revenue ratio puts the total revenue in relation to the

operating performance (measured by FFO) as a measure of the earnings potential of a REIT. As shown, the "operating performance" typically ranges from 30 to 50% (excl. Hotel REITs). The higher the percentage, the higher is the profitability of REITs in comparison to total revenues.

Breaking down the FFO to revenue for the other "non-five food groups" REIT sectors, the diagram above shows that the ratios differ from the five "traditional" REIT sectors. Visibly, Manufactured Housing REITs have the lowest FFO-to-revenue ratio. Analyzing the FFO-to-revenue ratio is important to put the FFO figures into perspective and to detect the revenue-generating capability of a REIT company. To conclude, FFO-to-revenue ratios have not remained constant over the period of investigation and are different across REIT sectors. While the long-term average FFO-to-revenue ratio of EQ-REITs is 38.3%, most REIT sectors such as HO-REITs, Self-storage REITs or Diversified REITs had a downward tendency in terms of historic FFO to revenue.

Figure 27: FFO to Revenue − Other REIT Sectors



Source: SNL REAL ESTATE, PFEFFER.

4.1.7 Section Summary

This analysis demonstrates that although REIT fundamentals are aligned most of the time – revealing a common "Equity-REIT Factor" − there are momentums and

differences that justify or accentuate the need for a sector-specific analysis. Notwithstanding that REIT sectors follow a general REIT trend, e.g., in terms of an increasing market capitalization, the intensity or shape of this development does not only differ across sectors but can also change over time. To summarize, REIT property sectors:

- Have different growth phases or years in terms of their (real estate) asset base.
- Differ in the degree of leverage. Hotel REITs have the lowest leverage (39%) and Apartment REITs can afford the highest degree of leverage (46%).
- Do not share the same ratio of gross real estate investment to total assets, e.g., Apartment REITs have a "real estate exposure" of 87%, but Regional Mall REITs have a real estate exposure of only 79% on average.
- Have being subjected to two different growth phases: Very high growth until the end of the New REIT era in 1999 and moderate growth subsequently.
- Real estate investment growth is one important driver of FFO growth.
- Office, Industrial, Retail, and Apartment REITs (the four "traditional" REIT property-type sectors) are more stable in terms of FFO to Revenue than Hotel REIT.

To conclude, it is necessary to continue with the property-type specific investigation in the following chapter. Property-type factors have a crucial effect on the ability of a REIT to grow its asset base and FFO growth as a proxy for earnings growth. This influences the dividend-paying capacity of a REIT based on the earnings growth potential from rents in the space markets a REIT is invested in.

Therefore, the accurate determination and precise analysis of market cycles in various space markets – differentiated by property types and local markets, e.g., the Atlanta office market versus the Denver industrial real estate market – are vital for the analysis of and investments in REITs. This given factor brings about the necessity of a precise market cycle analysis as conducted in the following section.

4.2 Operating Performance and Pricing of Real Estate Investment Trusts

The aim of this chapter is to analyze the performance of REIT sectors and companies that are part of the study. Generally, the total performance (Total Return) of REITs consists of two components: stock price changes and dividend payouts. Nonetheless, the shortcomings of traditional metrics such as earnings-per-share (EPS) or price-to-earnings-multiples (P/E) as a measure of REIT performance have led to the concepts of FFO, AFFO, and FFO multiples to estimate the income potential and pricing of a REIT.[224] Although total returns and dividend yields are important measures for understanding the overall performance of REITs, the analysis focuses on FFO (multiples) as key performance measures. Therefore, the performance analysis differentiates between two components: *earnings* of a REIT on the one hand and the *pricing* of REITs on the other hand. In this light, FFO is a measure for the earnings of a REIT while FFO multiples/stock price changes reflect the pricing of REIT sectors and companies. Since the performance of REITs and their role in a mixed-asset portfolio have already been analyzed by a number of researchers,[225] the section focuses only on the performance measures that are essential for the analysis and excludes more complex measures and ratios of performance such as "Treynor Ratios," "Jensen Alphas," or "Information Ratios."[226]

4.2.1 Funds from Operation and Pricing of Real Estate Investment Trusts – Sector Level

FFO multiples have emerged as an industry standard to determine the pricing of REITs. Since FFO multiples put the operating performance of REITs in relation to their stock price, FFO multiples represent the *relative* price of a REIT. Therefore, the comparison of FFO multiples of different REIT sectors as shown in Figure 28 illustrates the relative pricing of REITs over time. Also, the inverse of the FFO multiple represents the capitalization rate of REITs in the public real estate markets (either as a trailing or

[224] Compare Chapter 2.3.2, p. 42.

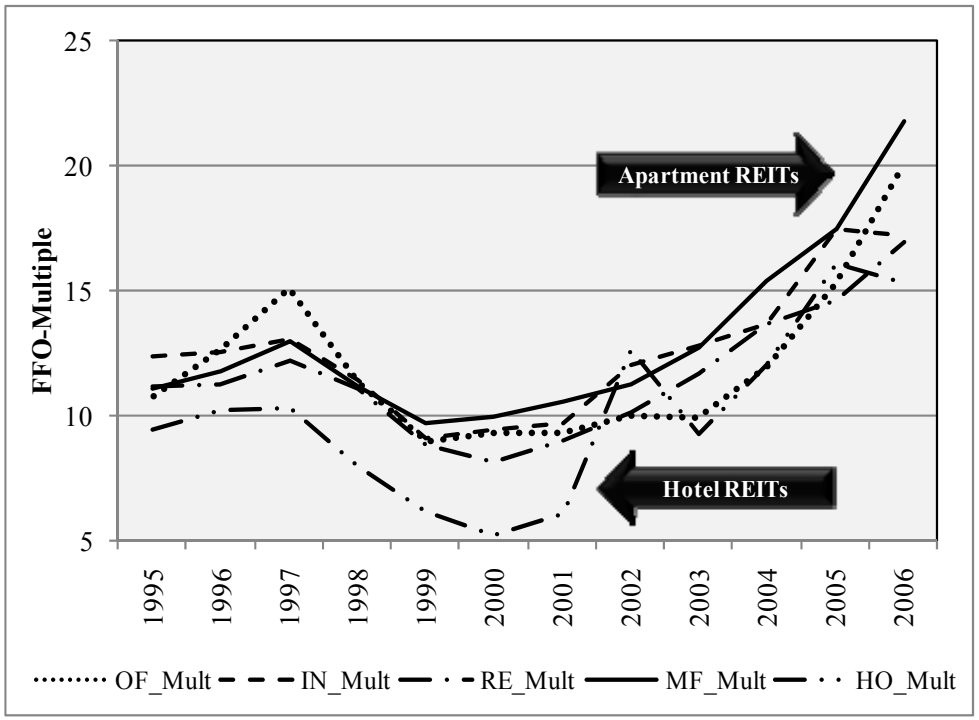
[225] Cf. STEPHEN, L./SIMON, S. (2006); LEE, S./STEVENSON, S. (2005a); BYRNE, P./LEE, S. (2005); GILIBERTO, M./HAMELINK, F. (1999); LIANG, Y./MYER, F.C.N./WEBB, J.R. (1996); GILIBERTO, S.M. (1992).

[226] Cf. PFEFFER, T. (2006), p. 21; ANONYMOUS (2002b), p. 1 et seqq.

present FFO multiple).[227] For reasons of clarity, the diagram shows the yearly FFO multiples instead of the quarterly figures that are used in the empirical analysis.

As shown, the pricing of Hotel REITs differs from the other four sectors that are more closely clustered together. Hotel REITs had their lowest pricing during 2000 and 2001. Theoretically, a negative multiple change can be subject to a stock price decrease or an FFO increase (or a mixture of the two). Despite the recovery of the Hotel sector after 2003, Hotel REITs seem to be more volatile in terms of their pricing and have a lower long-term average FFO multiple than the other four REIT property sectors. This reflects not only the cyclical but also the seasonal characteristics of hotel real estate as the underlying assets.

Figure 28: Relative Pricing of REIT Sectors by FFO Multiples



Note: "_Mult" stands for "Funds from Operation-Multiple"

Source: SNL REAL ESTATE, PFEFFER.

Furthermore, the diagram shows that Office REITs reached a multiple of more than 15 before the pricing of (Office) REITs decreased because investors shifted their investments away from "traditional" or "old economy" investments such as real estate to companies of the "New Economy." As a consequence, Figure 28 clearly shows that

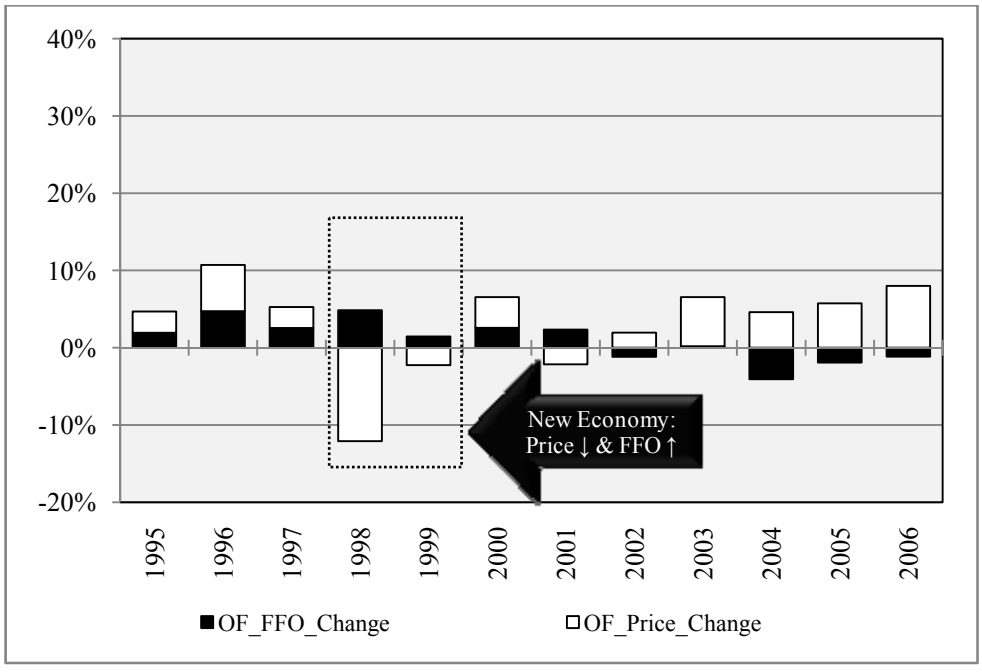
[227] Trailing versus present multiples.

all five sectors faced a decrease in their relative pricing until the end of 2000/01. After the crash of the New Economy bubble and the 9/11 terror attacks, FFO multiples increased after 2003 until the end of 2006. All five REIT sectors had their highest FFO multiple in 2006. Although FFO multiples are the preferred measure of pricing, FFO and stock price changes need to be analyzed separately to differentiate between operating performance and price changes. Having described the relative pricing of REIT sectors, the following sections show the results for the analysis of operating performance and price changes of REITs.

4.2.2 Funds from Operation and Pricing of Real Estate Investment Trusts – Office REITs

Analyzing the performance of the Office REIT sector, Figure 29 shows the sharp price change (-15%) Office REITs were subject to in 1998. In addition to 1998, 1999 and 2001 were the only years with a negative price change. As described, the New Economy bubble and the 9/11 attacks were major causes for capital flows out of Office REITs.

Figure 29: Price and FFO Change of the Office Sector



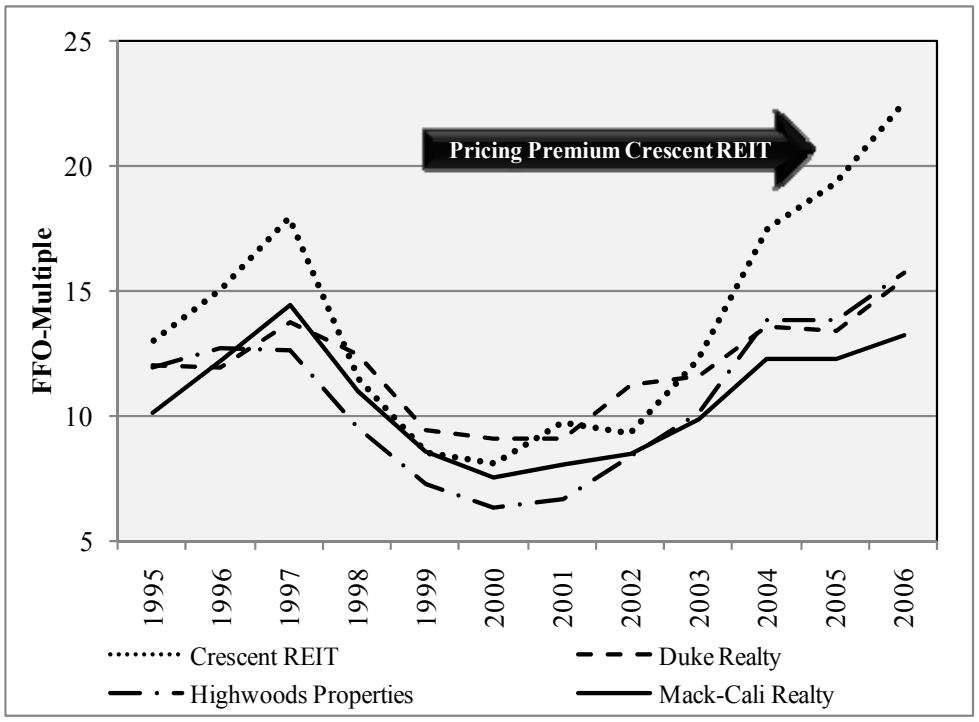
Source: SNL REAL ESTATE, PFEFFER.

Interestingly, the year with the largest positive FFO change (1998) was also the year with the largest negative price change. In contrast, the years with the highest positive price change (basically the period from 2002 to 2006) included two years with

significant FFO decreases (2004/05) or very low FFO growth. Altogether, the diagram illustrates that the price changes did not reflect the change in FFO approximately half of the time.

In addition to the changes over time of FFO and price change on a sector level, Figure 30 illustrates that multiples of individual companies differ quite significantly. In this way, the diagram illustrates that the multiples do not only vary by their average but also by their variance. Although Mack-Cali Realty Corporation had relatively stable multiples over the sample periods, other REITs such as the Crescent REIT were subject to large multiple changes. Since the main purpose of this study is the link between market cycles and the performance of REITs, the analysis of the operating performance and pricing of REITs stops here, and only takes the results as an input for the following analyses.

Figure 30: FFO Multiples of Office REITs



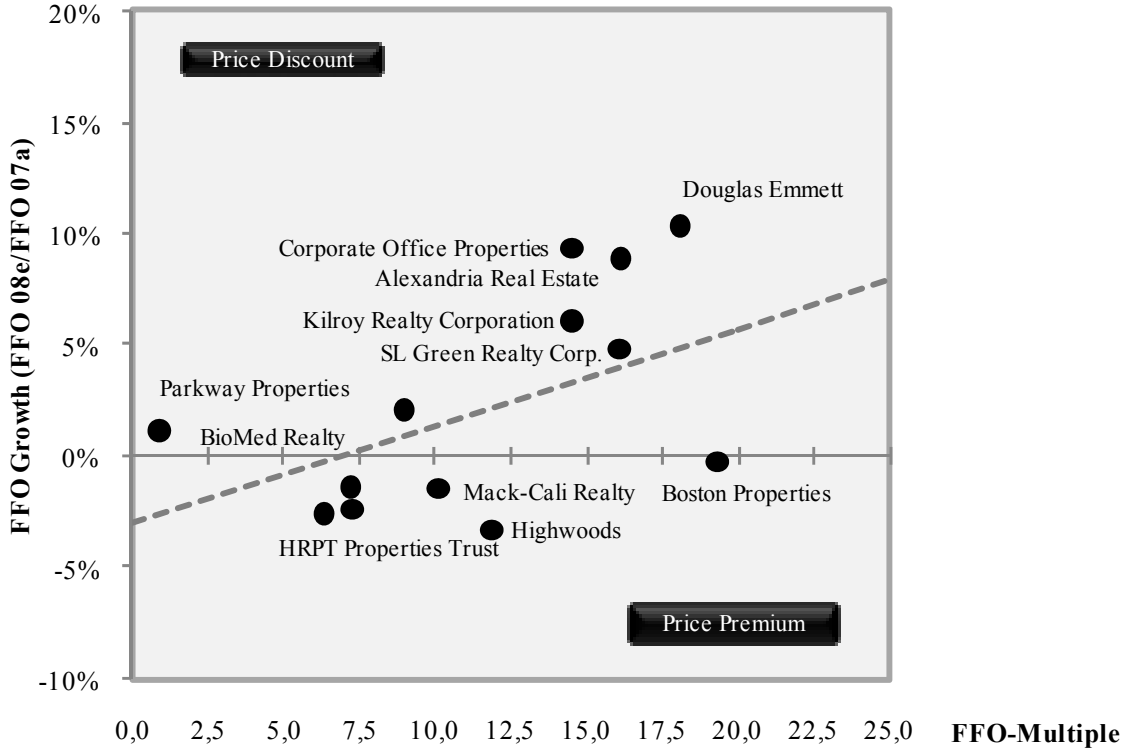
Source: SNL REAL ESTATE, PFEFFER.

Since there is no direct field for estimated FFO growth rates, the analysis uses the 2008 FFO estimated growth rates using the 2008 FFO estimates and giving preference to the 2007 reported operating FFO per share, whenever available. If there was no reported operating FFO per share for 2007, the 2007 FFO estimates are shown in the Excel sheet. Also, reported actuals are preferred over the estimates because the reported actuals are

considered to provide the most accurate growth rates. The analysis applies reported operating FFOs because these are the normalized FFO numbers. This is important because the following charts that put the pricing of REITs in relation to the expected earnings growth show the pricing discrepancies between individual companies of one REIT property type.

If the pricing of REIT companies was close to efficient in terms of the expected earnings growth, all companies should be on or near the regression line. The fact that the regression line has a positive slope means that on an aggregate level the pricing in this sector is *rational* because higher earnings expectations are reflected in a higher pricing. Nonetheless, there are big discrepancies from the regression line, indicating that there is potential to invest in undervalued REIT companies. In that case, the anticipated earnings growth would be reflected in the relative value of a REIT company.

Figure 31: Pricing and Earnings Rate – Office REIT Companies



Source: SNL REAL ESTATE, PFEFFER.

As highlighted, some companies such as Boston Properties, Inc. trade at a premium. This indicates that this company has a high multiple although the earnings growth expectations are low (close to 0%). This implies that there are other factors why the stock market prices this company at a relatively high multiple of nearly 20, although no

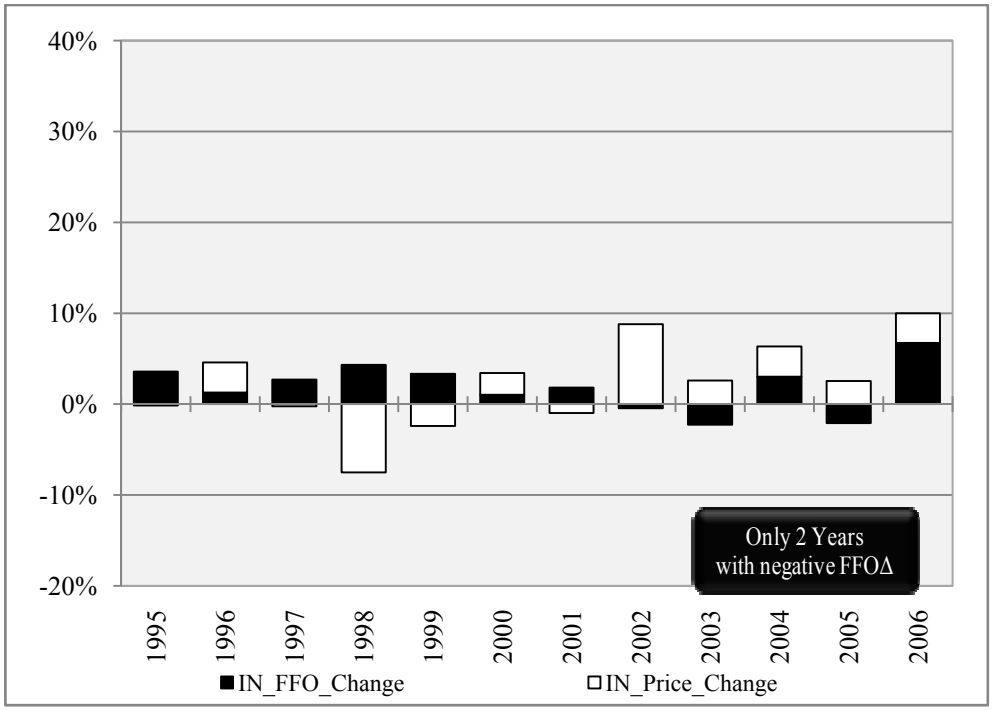
earnings growth is anticipated. On the other hand, companies such as Douglas Emmet, Inc. trade at a price discount, meaning that they have high earnings growth expectations (approx. 10%) but a relatively low FFO multiple.

4.2.3 Funds from Operation and Pricing of Real Estate Investment Trusts – Industrial REITs

Comparing the development of the Office REIT sector with the Industrial REIT sector reveals similarities and differences between the two sectors. Similar to the Office REIT sector, the Industrial REIT sector was affected by the capital flows out of REITs during 1998 and 1999. Nonetheless, the price change in 1998 was significantly lower. Also, Industrial REITs were subjected to price decreases in 2004 and 2006, while Office REITs were not.

In contrast to the Office REIT sector, Industrial REITs had no negative price change in 2001. This illustrates that the events of 9/11 primarily affected Office REITs more than Industrial REITs. In addition, the Office REIT sector never had a positive price change higher than 10%, whereas the Industrial sector benefited from large capital flows to Industrial REITs in 2002, which caused a price change of more than 10%.

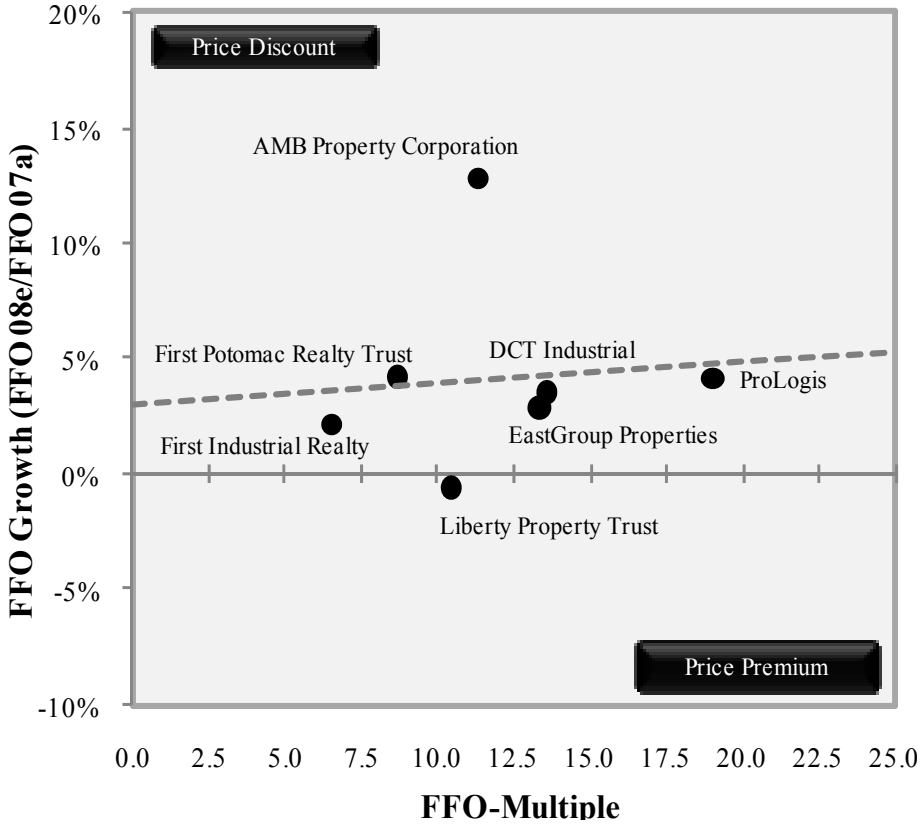
Figure 32: Price and FFO Change of the Industrial Sector



Source: SNL REAL ESTATE, PFEFFER.

Similarly to the Office REIT sector, pricing of the Industrial REIT sector does not reflect the earnings changes. Precisely, there are only two years (1996 and 2000) when FFO and price change are in line. Consequently, the stock price change in 2002 represents a substantial demand for Industrial REITs. While the Office REIT sector had a five-year period of positive stock price changes of around 5%, the Industrial sector had only one year with a significant positive stock price change.

Figure 33: Pricing and Earnings Rate – Industrial REIT Companies



Source: SNL REAL ESTATE, PFEFFER.

In addition to the sector-level analysis over the whole study period, Figure 33 illustrates the relationship between the pricing and earnings growth at a given point of time. In this way, the illustration demonstrates that – similar to the Office REIT sector – there is a positive relationship between the pricing of REITs and their earnings. This is confirmed by the positive R Square stated to the right of the diagram.

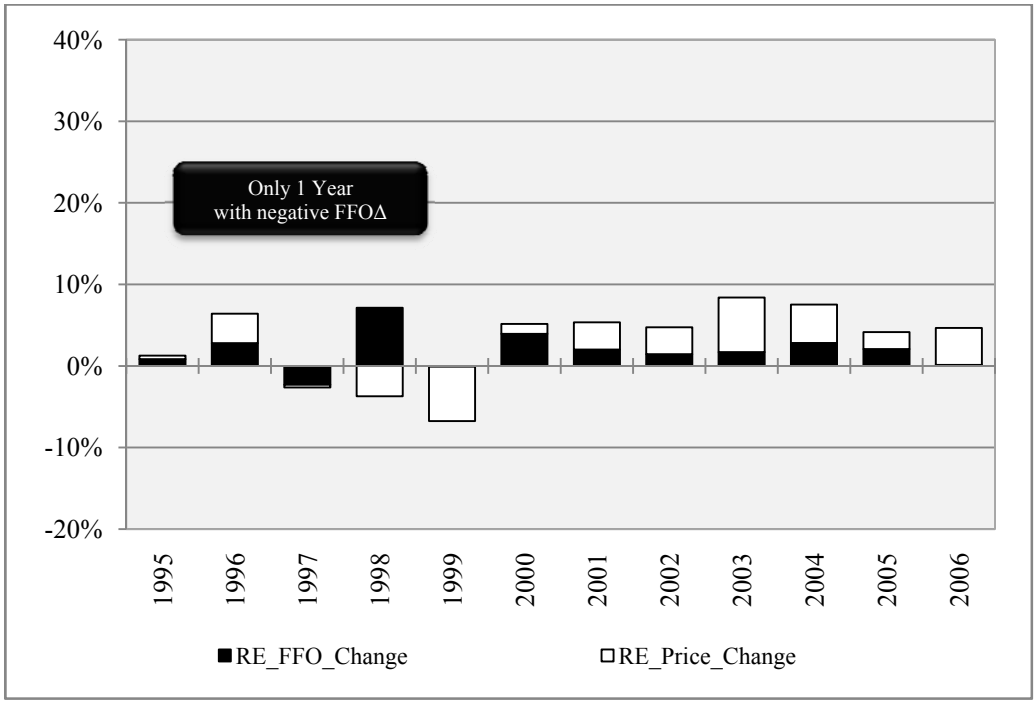
Nonetheless, there are significant outliers such as AMB Properties Corporation that trade above the regression line. Consequently, the stock market has not yet taken into consideration, does not agree with, or has other reasons to see the company at an FFO multiple of approx. 12. In addition, the slope is less than that for the Office REIT

companies. This implies that an increase in FFO growth expectations has a smaller effect or premium in terms of pricing.

4.2.4 Funds from Operation and Pricing of Real Estate Investment Trusts – Retail REITs

Investigating the dynamics of the pricing and operating performance of Retail REITs with the other REIT property sectors reveals that the retail sectors had the fewest years with a negative price change. Only in 1998 and 1999, when all REIT sectors were affected by capital outflows, did the Retail REIT sector have major negative price changes. In addition to these two years, the stock price changes of Retail REITs are more in line with FFO changes in comparison to the other sectors.

Figure 34: Price and FFO Change of the Retail Sector

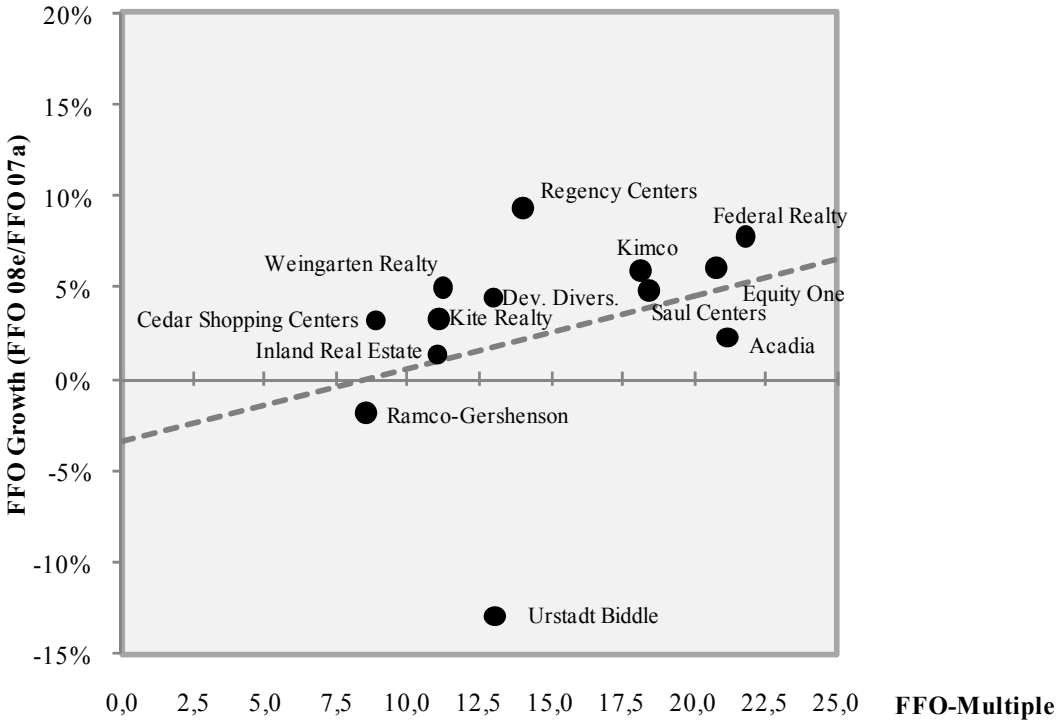


Source: SNL REAL ESTATE, PFEFFER.

Also, the Retail REIT sector has not been subject to price changes comparable to the Office or Industrial REIT sector. Even during 1998 and 1999, the price changes stayed under 4%. On the other hand, the Retail REIT sector did not have positive price changes of more than 6% such as the Industrial REIT sector. In addition, the Retail REIT sector is the only sector with a period of seven years, when the FFO and price change were in line (including 2002).

As shown in Figure 35, only one company – Urstadt Biddle Properties – seems to be a large outlier from the regression line. Although the company expects negative FFO growth, the FFO multiple is still relatively stable at 13. Also, the diagram shows that the earnings growth expectations within a sector can differ drastically, the same as the relative pricing of individual companies.

Figure 35: Pricing and Earnings Rate – Retail REIT Companies

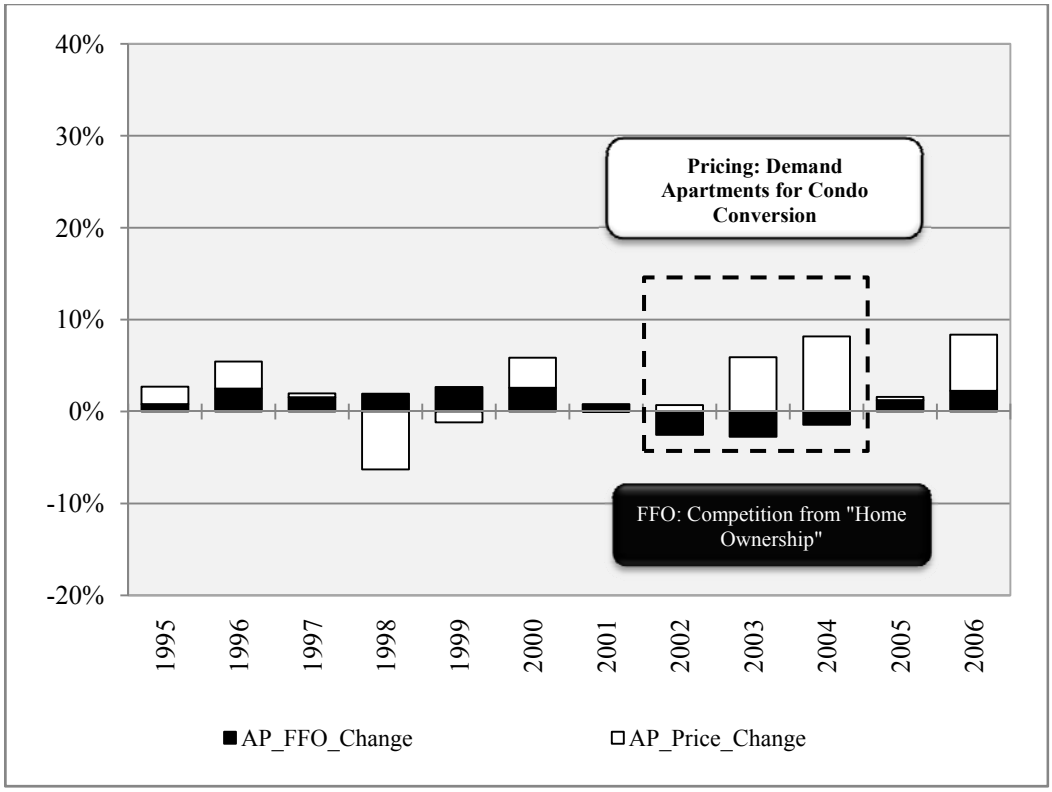


Source: SNL REAL ESTATE, PFEFFER.

4.2.5 Funds from Operation and Pricing of Real Estate Investment Trusts – Apartment REITs

Analyzing the FFO changes of the Apartment REIT sector, FFO has not been very volatile, with FFO changes ranging from minus three to 3% on a yearly basis. Nonetheless, stock price changes do not reflect this development. Comparable to the Retail REIT sector, the Apartment REIT sector has experienced mainly positive stock price changes except in 1998 and 1999. The same as the other sectors, the REIT stock price changes are mostly irrational, meaning that the movements are not in line with the corresponding Funds from Operation changes (representing the operating performance) during these years.

Figure 36: Price and FFO Change of the Apartment Sector



Source: SNL REAL ESTATE, PFEFFER.

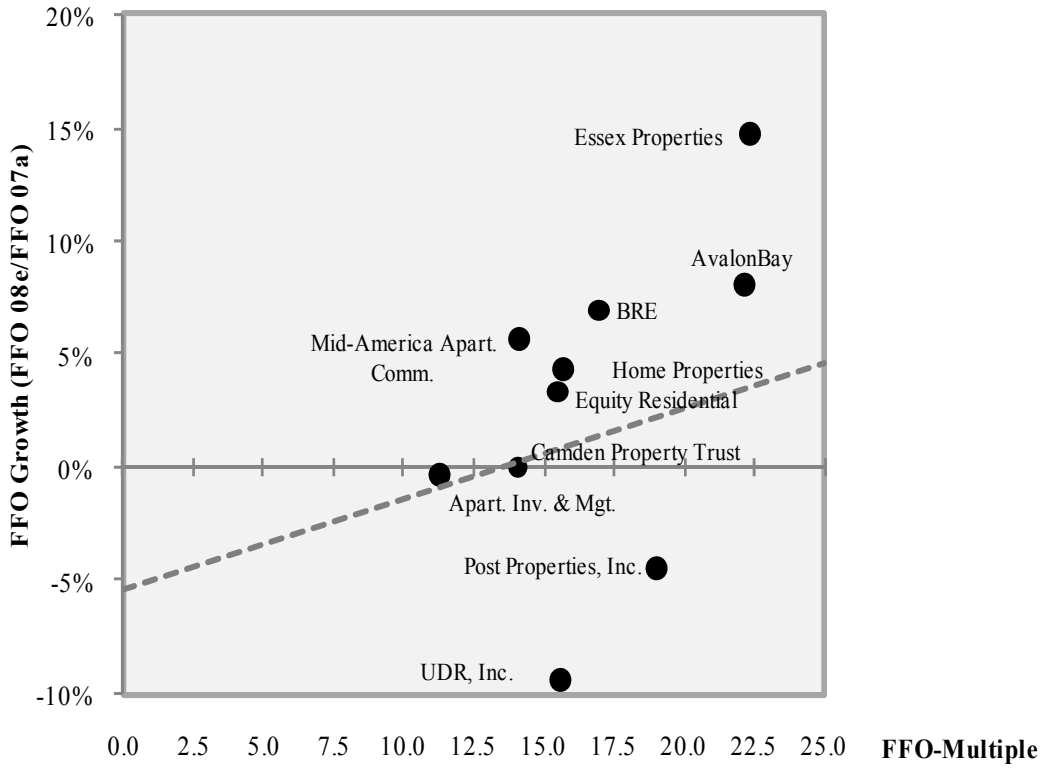
Although the volatility in terms of the range of FFO and stock price changes is relatively low compared to the other sectors, the figure below illustrates the differences by means of the ability to grow earnings. Since Apartment REITs are more specialized in terms of NCREIF regions than other REIT property sectors such as Industrial, Retail, or Hotel,[228] the earnings growth based on the market exposure can differ more drastically.

This might be an explanation for the large range of FFO growth. Similarly, the range of FFO multiples is relatively high, from around 10x to 23x. In this context, the figure below shows that the lowest standard deviation of FFO change over the whole study period. Clearly, this is based on the stable space market fundamentals as shown in the table. For example, the standard deviation of occupancy change is 0.002 that is very low.[229]

[228] Cf. Chapter 4.4: Real Estate Investment Strategies of Real Estate Investment Trusts.

[229] Apartment and industrial have the lowest standard deviation of all five sectors.

Figure 37: Pricing and Earnings Rate – Apartment REIT Companies

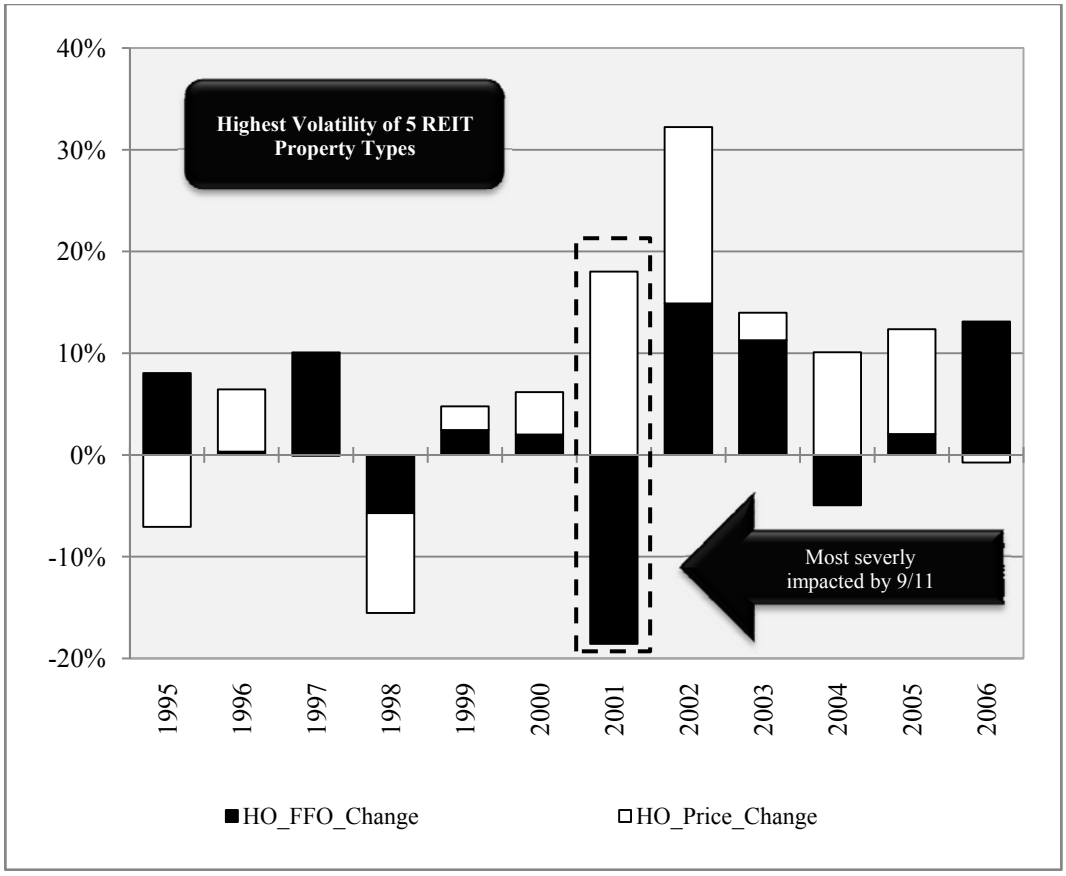


Source: SNL REAL ESTATE, PFEFFER.

4.2.6 Funds from Operation and Pricing of Real Estate Investment Trusts – Hotel REITs

Analyzing the FFO and price change over the study period shows that the Hotel REIT sector seems to be more volatile both in terms of its FFO and price changes. For example, no other sector experienced a price change of more than 20% as Hotel REITs did in 2002. Also, the Hotel REIT sector was the only sector that had an FFO change of more than 20% (2006) or nearly 20% (1997). Taking into consideration the special characteristics of hotel real estate, with daily pricing of room rates and extremely short leasing periods compared to the other sectors, the findings appear to be reasonable. Interestingly, the Hotel REIT sector was the only sector that had a positive price change (in 1999) during 1998 and 1999. In comparison, FFO from the Apartment Housing sector changed twice in terms of its sign, from positive to negative in 2001/02 and vice versa in 2004/05. As highlighted, 2001 was the most difficult with stock price and FFO discounts. Hotel REIT Funds from Operation decreased by more than 10%, and the stock price index of the Hotel REIT sector decreased by approx. 7%.

Figure 38: Price and FFO Change of the Hotel Sector



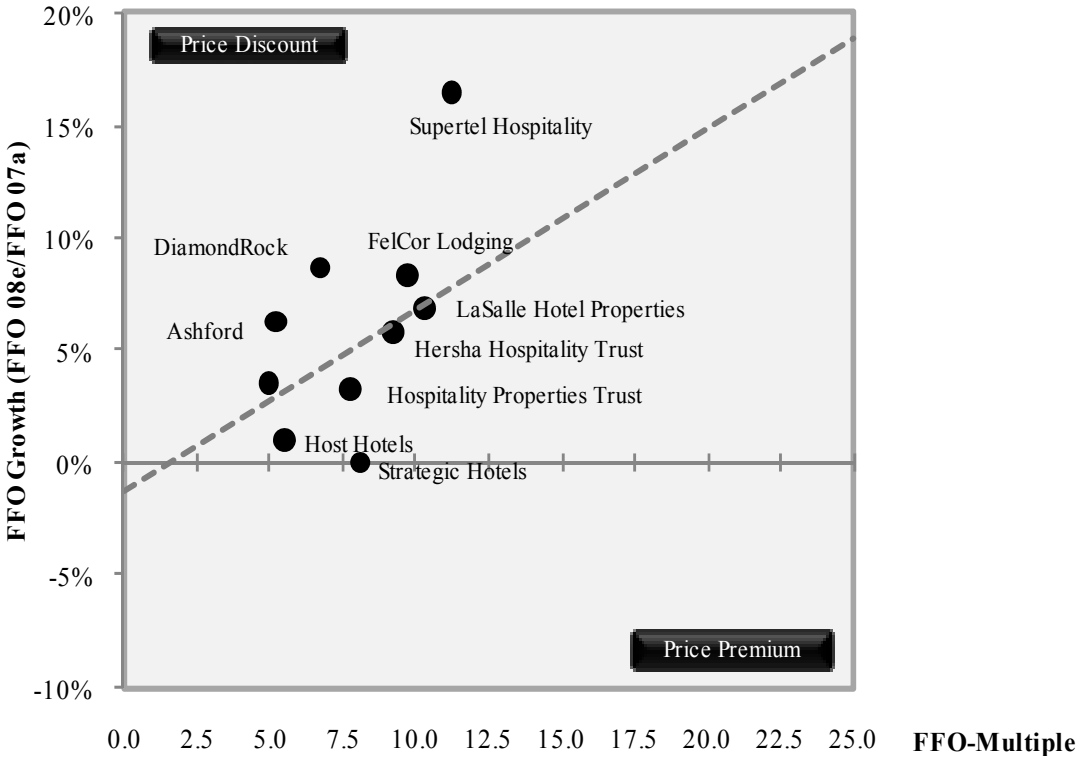
Source: SNL REAL ESTATE, PFEFFER.

Similar to the Office REIT sector, the Hotel REIT sector was subject to negative price changes after the 9/11 attacks. Nonetheless, Hotel REITs also had a significant negative FFO change in this year as a result of less demand from holiday and business travelers. This means that the negative price change reflected the space market fundamentals, which was not the case for Office REITs during this time.

Furthermore, the Hotel REIT sector is more volatile in the sense that FFO changes more often from positive to negative. This means that FFO changed from positive to negative in 1998/99, 1999/00, 2000/00, 2001/02, 2003/04, and 2004/05. This shows the additional volatility of Hotel REITs.

Similar to the other four REIT property sectors, the regression line indicates that future earnings growth is reflected in a higher relative value of the company in the stock market. This by itself is an important finding. Nonetheless, the findings suggest that investors can take advantage of undervalued companies, for example Ashford Hospitality Trust, Inc.

Figure 39: Pricing and Earnings Rate – Hotel REIT Companies



Source: SNL REAL ESTATE, PFEFFER.

Also, the regression line in the Hotel REITs companies sample has the highest grade, indicating that a positive change in FFO growth expectations is reflected in an FFO multiple increase. Considering the volatility of the hotel real estate business, these findings appear to be reasonable.

4.2.7 Section Summary

In summary, the chapter shows that REIT sectors differ in their FFO as well as in their stock price changes on a sector level, not only in terms of the yearly performance as shown here, but also in terms of the intensity of earnings and pricing changes. The essential results can be summarized as follows:

- The pricing in terms of stock price changes did not reflect the FFO change of the same year in most years. This means that the pricing of REIT sectors on an aggregate level has been irrational by means of earnings most of the time.

- The Hotel REIT sector shows significantly different dynamics from the four other REIT property type sectors. For example, the REIT property sectors trade at different FFO multiples (e.g., Hotel 10x versus Apartment 13.5x).[230]
- The pricing component of REITs represents a larger share of the total return than the earnings component (approx. 7 to 5).[231]
- In terms of pricing, Hotel REITs are the most volatile, followed by Office and Industrial REITs; Apartment and Retail REITs are the most stable sectors.
- The pricing of individual companies *within* a sector seems to be rational in terms of a positive regression line. This means that high-growth expectations are reflected in higher multiples.
- Discrepancies from the regression line illustrate the importance of idiosyncratic factors for the pricing of REITs.

Since FFO stems from revenue that is generated from properties in different space markets, it is essential to understand the dynamics of space markets for different property types, as analyzed in the following section. Without a profound analysis of the space market cycles in different metro areas and property types, the analysis of the link between space markets and REIT earnings and pricing is inconclusive. In this way, the following section aims to illustrate *where* the space market performance of REIT sectors stems from.

[230] FFO multiples are a more meaningful measure than the stock price by itself because the FFO multiple expresses the "relative value" of a REIT to its earnings. In this case, the analysis uses present or forward multiples not trailing multiples.

[231] Compare Figure 1: Private versus Public Real Estate Pricing – Return Components, p. 4.

4.3 Characteristics and Development of Space Markets

The aim of this section is to describe and investigate the characteristics and dynamics of the individual real estate markets (by property type) that are subject to the analysis. Without a profound understanding of the market cycle parameters, an in-depth analysis of the impact of space market cycles is not possible. Therefore, the following section analyzes the most important physical market cycle characteristics:

- Size, Structure, and Change of Market Stock (absolute and relative)
- Absorption/Demand
- Completions/Supply
- Supply/Demand Discrepancies
- Vacancy Levels
- Rent Levels

It is important to distinguish that the physical market cycle analysis in this section does not investigate the specific exposure of REIT sectors or companies in the respective markets but rather aims to give an overview of physical market cycles in general. Examining the size, structure, and change of market stock is necessary to determine the importance of individual markets. Scrutinizing changes in demand for and supply of space − that is not in equilibrium most of the time − is essential to realize the dynamics of vacancy levels. A change in vacancies can be caused by an increase or decrease from the demand as well as the supply side. Finally, rent levels are the result of changing demand and supply interactions and the most important driver of FFO, which is the focal performance measure of this analysis.

4.3.1 Size, Structure, and Change of Space Markets

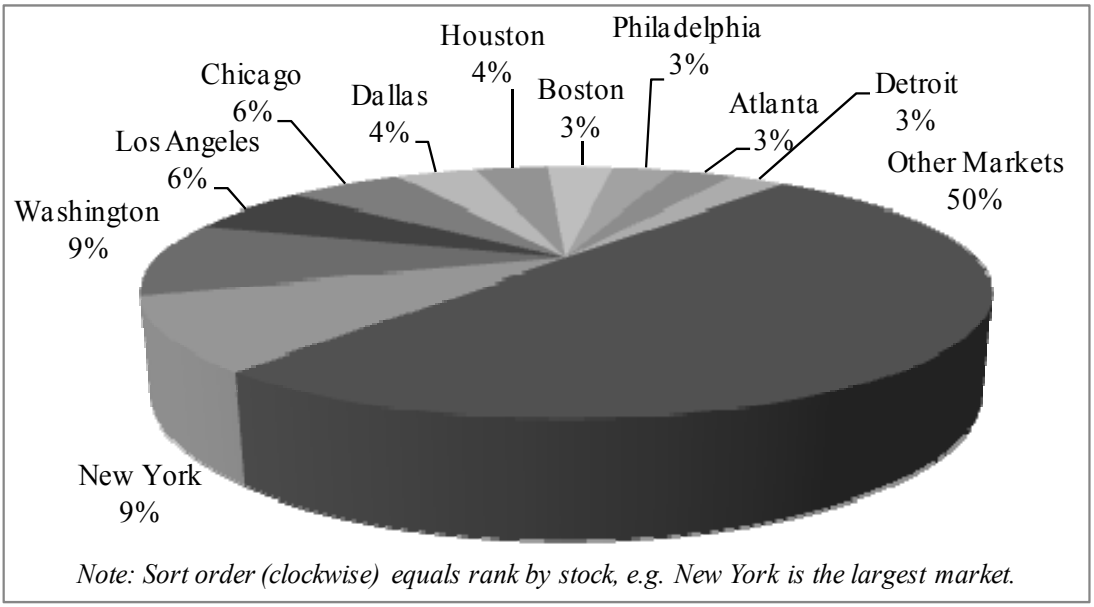
Looking at the share of the 10 largest office markets that REITs invest in, which combine nearly 50% of the investable universe, four large markets (New York, Washington, DC, LA, and Chicago) have a market stock that represents more than 5%, as shown in Figure 40.

Nonetheless, these markets are in different states and economic regions that are driven by different fundamentals.[232] In total, 11 markets have a share of more than 2% and 32 markets with a share of more than 1%. Consequently, there are two (18%) or four (30%) large markets that have a substantial share; in addition office properties are widely spread over the United States with most markets (28) having a share of between 1% and 5%.

4.3.1.1 Characteristics and Development of the Office Real Estate Market

Figure 40 shows the average market share over the study period from 1995 to 2006. In contrast, Figure 41 shows the absolute size of the 10 largest office markets by total stock in 1995 and the amount of office stock that was added until 2006. The illustration illustrates that – similar to the other MSAs in the sample – markets have grown at a different pace. Notably, it is shown that the Washington, DC, market has grown faster than the New York market in terms of size, for example. Precisely, the Washington, DC, market grew by 18.6% over 12 years while the New York market grew by 8.7% in total.

Figure 40: Share of the 10 Largest Office Markets



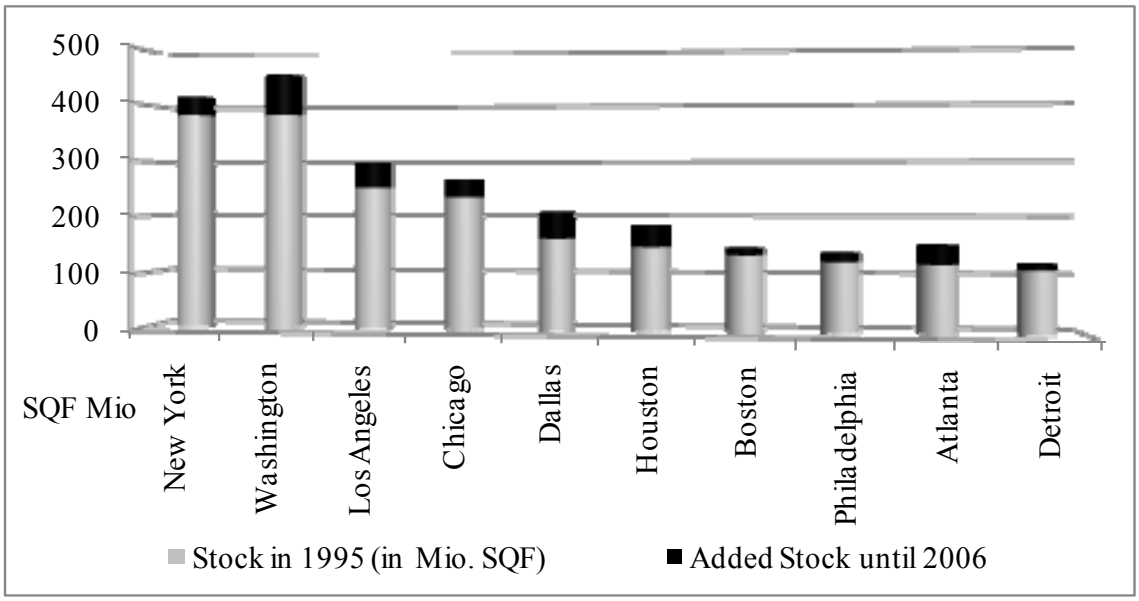
Note: Sort order (clockwise) equals rank by stock, e.g. New York is the largest market.

Source: PPR, PFEFFER.

[232] Cf. DOKKO, Y./ET AL. (1999); GORDON, J./MOSBAUGH, P./CANTER, T. (1996).

Consequently, Washington, DC, has superseded New York as the largest office market. Analytically speaking, Washington, DC, has added more than 70 Mio square feet, which equals an annual increase of more than 5.8 Mio square feet. From a relative perspective, Dallas (28%) and Atlanta (27%) had the largest increase in office stock.

Figure 41: Size and Change of 10 Largest Office Properties Markets



Source: PPR, PFEFFER.

Referring to all markets in the sample, Table 14 shows the 10 fastest- and slowest-growing markets. From a relative perspective, Las Vegas was the fastest-growing market. This means that the Las Vegas office market by stock grew by an average of 7.9% every year, which equals 1.6 million square feet total. In this way, Las Vegas has grown faster by more than 3.5 basis points than any other office market in the United States (10 times faster than Boston or New York). Furthermore, two California cities, San Diego and Sacramento, belong to the fastest-growing markets with an average of 3.4% and 3.5%, respectively. This refers to the growth of total market size, not REITs' investment growth in these office space markets. The large increase in office stock in the 10 fastest-growing markets implies that the necessary building sites and development rights are available.

Also, Table 14 shows the 10 slowest-growing markets. Looking at these markets, it becomes apparent that these are very "supply constraint" markets. Supply constraints can arise from various factors, e.g., restrictive building rights and codes, unavailability

of appropriate building sites, or if new construction in not cost-feasible.[233] Furthermore, it is easier for a small market, e.g., Las Vegas, to grow faster from a relative perspective. If, for example, New York grows at a percentage of 8%, this would represent more than 30 million square feet of office space. Interestingly, the 10 slowest-growing markets can be grouped into two categories: the "large markets" such as Chicago, San Francisco, Detroit, New York, etc. and rather very small markets such as Bridgeport/Stamford or Hartford.

Table 14: 10 Fastest- and Slowest-growing Office Markets – 1995:1 - 2006:4

Market	Growth	1,000 SF	Market	Growth	1,000 SF
Las Vegas, NV	**7.9%**	2,753	Honolulu, HI	**1.4%**	1,327
Salt Lake City, UT	**4.2%**	5,874	San Francisco, CA	**1.4%**	621
Phoenix, AZ	**3.9%**	3,975	Chicago, IL	**1.3%**	901
Raleigh, NC	**3.8%**	2,933	Hartford, CT	**1.1%**	233
Charlotte, NC-SC	**3.7%**	3,835	Philadelphia, PA-NJ	**1.0%**	683
Palm Beach County, FL	**3.5%**	3,083	Bridgeport/ Stamford, CT	**1.0%**	344
Austin, TX	**3.5%**	953	New Orleans, LA	**0.8%**	442
San Diego, CA	**3.4%**	1,233	Detroit, MI	**0.8%**	836
Memphis, TN	**3.4%**	2,691	New York, NY - NJ	**0.7%**	808
Sacramento, CA	**3.3%**	864	Boston, MA	**0.7%**	1,605

National LT Growth: 1995 - 2006 = 22.5% (≈ 1.9% Ø per YR) versus 1987 - 2006 = 55.8% (≈ 2.8% Ø per YR).

Source: PPR, PFEFFER.

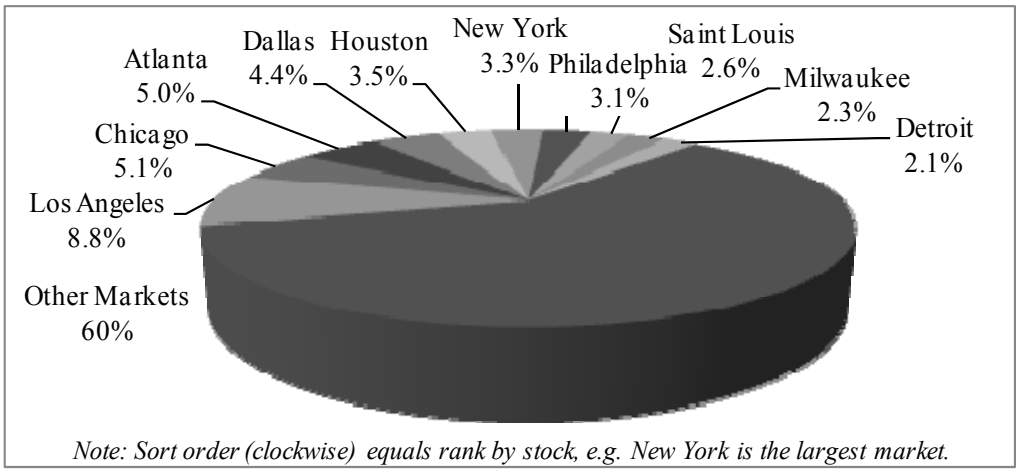
4.3.1.2 Characteristics and Development of the Industrial Real Estate Market

Analyzing the market share of the 10 largest industrial markets reveals a different picture. Compared to the office segment, the 10 largest markets have a smaller percentage with 40%, and the assortment and sort order of the markets is different. For example, the Washington, DC, market was the largest office market but ranks as only number 20 for industrial real estate.

Similarly, New York represents around only 3%. On the other hand, Los Angeles and Chicago have nearly the same importance in terms of size for office and industrial real estate. This illustrates that these markets have a different structure regarding use types. Additionally, air or port hubs such as Dallas or St. Louis have a higher share of industrial real estate than office real estate.

[233] Cf. HESS, R./LIANG, Y. (2003a); BENJAMIN, J.D./JUD, G.D./WINKLER, D.T. (1998b)

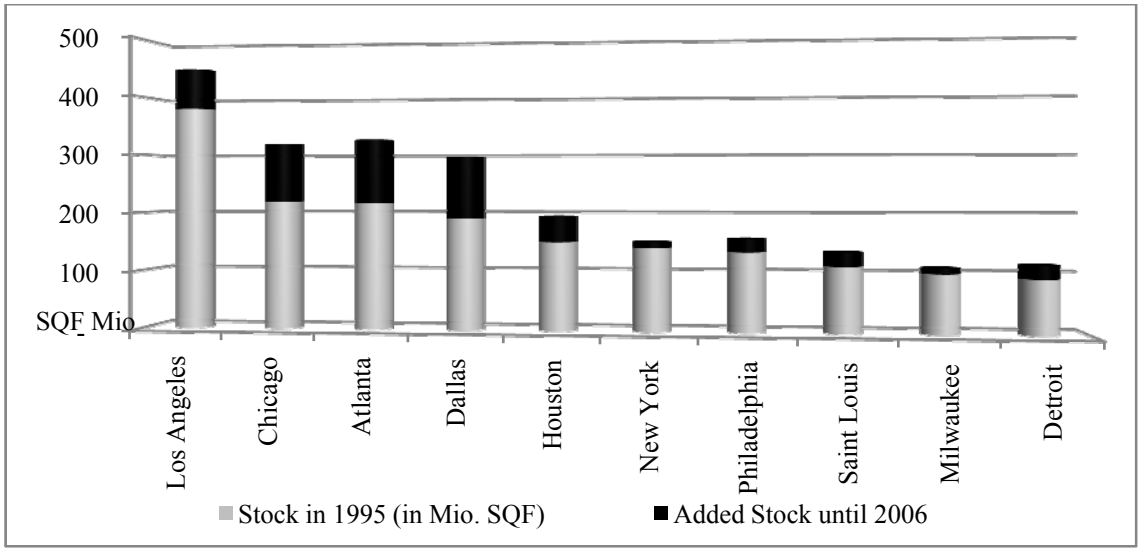
Figure 42: Share of the 10 Largest Industrial Markets



Source: PPR, PFEFFER.

After having analyzed the average size of the 10 largest markets, Figure 43 shows how the 10 largest markets have changed in size over the study period. Notably, the large air and port hubs such as Chicago, Atlanta, Houston, and Dallas along the Path of Goods Movement had the highest growth, ranging between 3.8% for Chicago and 4.6% per year for Dallas.

Figure 43: Size and Change of 10 Largest Industrial Properties Markets



Source: PPR, PFEFFER.

Furthermore, Los Angeles benefited from the increased trade with China and increased its market stock by more than 68 million square feet. The traditional markets such as New York or Milwaukee as major ports for the trade with Europe, or Chicago with its industrial base of manufacturing firms, could not keep pace with the other large

markets. Comparing the growth of the 10 largest markets with the long-term national average of 2.7%, only four markets (Chicago, Atlanta, Dallas, and Houston) had growth higher than or close to the national average.

Speaking about the fastest- and slowest-growing markets in terms of size, some markets such as Las Vegas nearly doubled in size over the 12-year period. Only four markets (Las Vegas, Austin, Memphis, and Charlotte) are also part of the 10 fastest-growing office markets. This illustrates that the industrial and office markets have partly different fundamentals that drive the development of these particular property type sectors.

Moreover, the conclusion can be drawn from Table 15 that the large MSAs such as New York or San Francisco have paled in comparison to other locations. This makes sense when taking into consideration the high land acquisition and building costs within these MSAs. Consequently, it can be concluded that the dynamics of industrial locations (and their importance accordingly) changed during the study period.

Table 15: 10 Fastest- and Slowest-growing Industrial Markets – 1995:1 - 2006:4

Market	Growth	1,000 SF	Market	Growth	1,000 SF
Las Vegas	**7.1%**	2,552	Philadelphia	**1.4%**	1,888
Austin	**5.6%**	781	Cleveland	**1.2%**	955
Nashville	**5.3%**	2,086	Hartford	**1.1%**	327
Cincinnati	**5.1%**	2,722	Pittsburgh	**0.9%**	487
Indianapolis	**5.1%**	3,641	Honolulu	**0.9%**	194
Memphis	**5.0%**	4,265	Milwaukee	**0.8%**	807
Phoenix	**4.8%**	3,264	San Jose	**0.7%**	270
Dallas	**4.6%**	8,789	New York	**0.6%**	850
Atlanta	**4.2%**	9,061	San Francisco	**0.4%**	120
Charlotte	**4.1%**	1,566	New Orleans	**0.3%**	113

National LT Growth Industrial: 1995 - 2006 = 32.3% (≈ 2.7% Ø per YR); 1987 - 2006 = 53.5% (≈ 2.7% Ø per YR).

Source: PPR, PFEFFER.

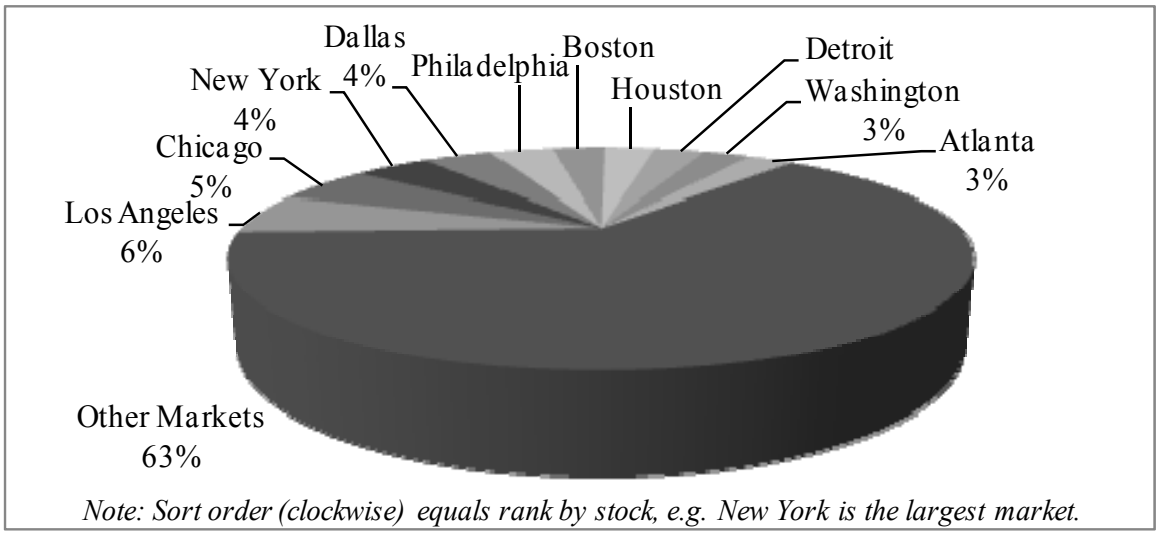
4.3.1.3 Characteristics and Development of the Retail Real Estate Market

Figure 44 proves that of all five property types, the 10 largest markets (aggregated) have the smallest share of the investable stock with 37%. This demonstrates that retail real estate has at least partly different site selection characteristics. The study conducted by

the ICSC (2002) analyzed the lack of retailers in many communities, especially in large inner-city markets, and noted that they remain underserved because retailers misunderstand the potential of these markets.[234]

Additionally, locations within MSAs typically have higher costs and take longer to develop. Although these locations are more pedestrian friendly, the need for parking or access to transportation explains the relatively low number of retail properties in the large, urban markets. As a result of these spatial needs and locational preferences, a smaller percentage of retail real estate is located within the Metropolitan Statistical Areas of this analysis. In addition, free-standing retail properties such as regional malls or outlet centers that represent a large percentage of the asset are normally found outside the Metropolitan Statistical Areas. Therefore, a higher share of these buildings is not located within one of the MSAs. Nonetheless, 87% of all retail properties are located within one of the 48 MSAs in this sample. As shown in Figure 44, retail properties correlate with the population density and buying power. Consequently, the largest cities are the largest retail markets.

Figure 44: Share of the 10 Largest Retail Properties Markets



Note: Sort order (clockwise) equals rank by stock, e.g. New York is the largest market.

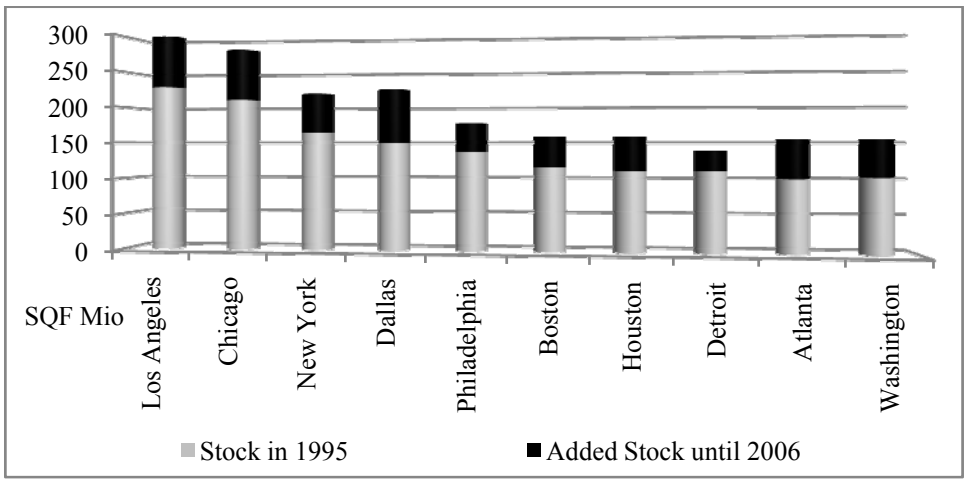
Source: PPR, PFEFFER.

Nonetheless, these cities have developed in a different way, depending on their demographic trend and spending power representing the overall economic development of the market. Markets with a relatively strong increase in population and/or spending power such as LA or Dallas have increased their stock faster than other markets such as

[234] Cf. ICSC (2002), p.2.

Detroit. Figure 45 shows the development of only the 10 largest markets. It can take longer and be more complicated to construct new retail properties in these urban areas. These obstacles translate into higher costs, which make "green field" developments more attractive. This can help to explain why only four (Dallas, Houston, Atlanta, and Washington, DC) out of the 10 largest markets were able to outpace the average national growth rate of 3.2%.

Figure 45: Size and Change of 10 Largest Retail Properties Markets



Source: PPR, PFEFFER.

Continuing with the fastest- and slowest-growing markets, as shown in Table 16, retail stock in general has grown faster than industrial and office real estate (3.2% on average, 1995 to 2006). For example, Las Vegas has seen a large amount of speculative retail development that was driven by the positive development of the hospitality and gambling industry. With a constant increase in rents and a high population growth (e.g., 3.37% in 2007) combined with a city that is founded on rampant consumer spending, Las Vegas retail stock has grown at an average rate of 6.2% per year. Similarly, Raleigh as well as Phoenix/Tucson have experienced very positive fundamentals over the study period, with a significant population growth and increase in household income.[235] Although all of the 10 fastest-growing markets had very positive development in population and spending power, the drivers are not always the same. This means that Orlando has benefited from its prospering hospitality industry, particularly theme parks, that triggered the demand for new retail space while Austin benefited from the stellar performance of the oil/petroleum industry. It is important to note that this may also hold

[235] Cf. RE-BUSINESSONLINE (2007), no page.

true for some of the slower developing retail markets, which may have stricter building codes, fewer adequate building sites, and higher costs, which make the construction of new space more difficult in these markets. Interestingly, there is one market that has a negative investment growth (-0.4%), which means that the retail space has decreased over the 12-year period. Due to the catastrophic impact of Hurricane Katrina in 2005 that caused more than $80 billion in damage, a significant amount of retail space was destroyed.

Table 16: 10 Fastest- and Slowest-growing Retail Markets – 1995:1 - 2006:4

Market	Growth	1,000 SF	Market	Growth	1,000 SF
Raleigh	**6.4%**	1,998	Pittsburgh	**2.5%**	1,754
Las Vegas	**6.2%**	2,365	Miami	**2.5%**	1,642
Phoenix	**6.1%**	5,367	Philadelphia	**2.4%**	3,336
Orlando	**5.2%**	2,684	San Francisco	**2.4%**	1,253
Salt Lake	**4.9%**	1,647	Baltimore	**2.3%**	1,814
Oklahoma	**4.4%**	1,118	Milwaukee	**2.2%**	1,066
Atlanta	**4.4%**	4,433	Memphis	**2.1%**	684
Austin	**4.4%**	1,256	Detroit	**2.1%**	2,274
Washington, DC	**4.2%**	4,322	Bridgeport	**1.7%**	718
Charlotte	**4.2%**	1,948	New Orleans	**-0.4%**	(175)

National LT Growth Retail: 1995 - 2006 = 38.7% (≈ 3.2% Ø per YR); 1987 - 2006 = 63% (≈ 3.2% Ø per YR).

Source: PPR, PFEFFER.

4.3.1.4 Characteristics and Development of the Apartment Properties Market

Several economic indicators affect the size and growth of the apartment segment, particularly employment, household composition, job growth on the demand side, permits on the supply side, housing affordability, demographic trends (e.g., the coming of the "echo boomers"),[236] and other economic parameters.[237]

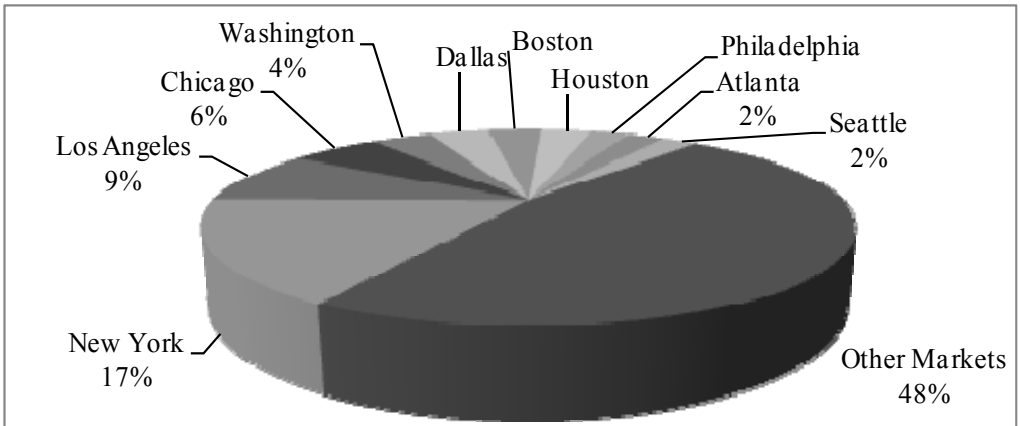
As pointed out in Figure 46, the majority (52%) of all apartment properties are located in the 10 largest markets. As evidence, New York is by far the largest market for apartment properties. Compared to the office, industrial, and retail segments, none of the MSAs of these property types had a share larger than 10%. Evidently, the share of

[236] "Echo boomers" is a term for the generation born between 1979 and 1985 that are just beginning to hit their prime rental years. Only slightly smaller than the 78 million–member baby boom generation, the echo boomers dwarf the 55 million members of Generation X and will exert considerable influence over the apartment market. Refer to the ULI (2004) report.

[237] Cf. AXIOMETRICS (2007), no page.

apartment properties in MSAs is higher or equal to the other property types because most quality apartment buildings are located in urban areas. Looking at the markets, percentages, and sort order reveals a picture similar to the office market (only New York had a significantly different/higher share).

Figure 46: Share of the 10 Largest Apartment Properties Markets



Note: Sort order (clockwise) equals rank by stock, e.g. New York is the largest market.

Source: PPR, PFEFFER.

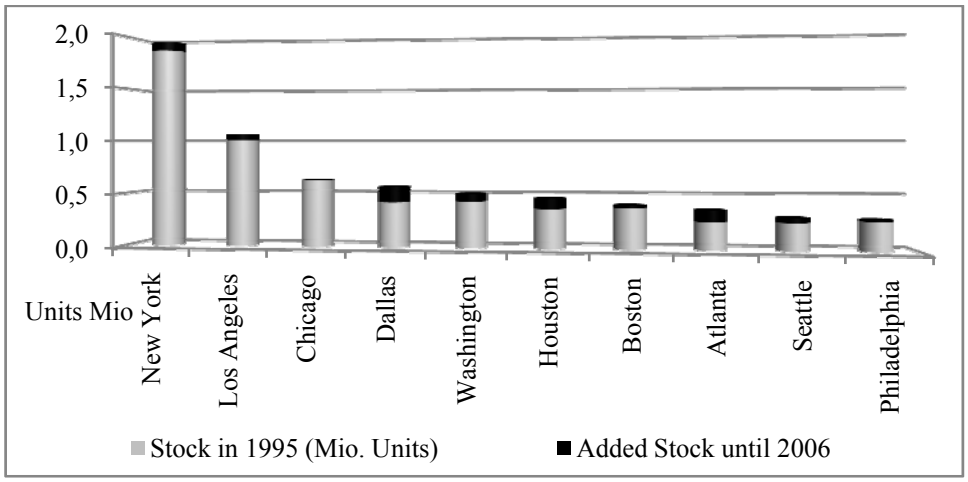
Moreover, the number of markets that have a share of at least 1% of the total investable universe of apartment properties is significantly lower: 25 of the 48 markets (32 for office, 33 for industrial, 37 for retail). The stable and improving economies in major metropolitan areas during the study period have fueled the demand for rental housing throughout the United States.[238] Nonetheless, Figure 47 shows that the growth in the 10 largest markets was relatively small compared to the other property types. Comparing the yearly growth in total stock with the long-term national average over the period of investigation of 1.2% per year (1.3% for the 20-year average), it is obvious that only three of the 10 markets have a higher growth rate (Dallas with 2.9%, Houston with 2.2%, and Atlanta with 3.5% per year).

Moreover, the apartment properties stock remained nearly constant, for example, in Chicago with an average yearly increase of 0.02% or Boston with 0.6%. Apparently, the supply side is more constrained in these markets, e.g., through permits, availability of building sites, and high costs. Furthermore, historically low interest rates have affected the apartment rental markets in many areas of the country. As a consequence,

[238] Cf. ESTATE, P.R. (2005).

condominiums were an attractive and affordable alternative for some of the "traditional" renters.

Figure 47: Size and Change of 10 Largest Apartment Properties Markets



Source: PPR, PFEFFER.

Understanding the dynamics and growth of apartment markets as shown in Table 17 involves more than permits (supply side) and employment as one factor on the demand side. First, affordability is one major concern. This means that a typical three- or four-person family with one full-time worker cannot or hardly afford a market-rate apartment in one of the large MSAs such as New York or Los Angeles. Since median family income has decreased during the study period, many families cannot afford an apartment in these markets and rent properties outside the metropolitan areas or buy in suburban areas if they can afford it.[239]

On the other hand, the supply of stock in the fastest-growing markets was fostered by workforce housing, e.g., in Orlando where a large number of the workforce of the hospitality industry and theme parks is between 20 and 35 years old and cannot afford to buy a house in most cases.[240] Furthermore, apartment markets are impacted positively and negatively by changing demographics, e.g., the increase in minorities. Precisely, half of minorities and three-fourths of immigrants are renters. In total figures, four million of the 12 million new households that will be formed in the United States between 2001 and 2010, and which likely be renters, are composed of minorities and immigrants. Other markets such as Las Vegas have benefited from positive tax laws

[239] Cf. ULI (2004), p. 1.

[240] Cf. ORLANDO-BIZ (2002), p. 2.

(not imposing income tax), which make this market appealing for immigrants who fueled the demand for rental properties. Other markets such as Austin have benefited from the growing workforce in the petroleum and energy sector and government employment as the capital of Texas.[241] According to the U.S. Census Bureau, the Austin MSA experienced the largest increase in income in Texas and was one of the fastest-growing cities in the United States. This is reflected in a very high number of permits on the supply side that enabled the large increase in stock.[242]

Table 17: 10 Fastest- and Slowest-growing Apartment Markets – 1995:1 - 2006:4

Market	Growth	1,000 SF	Market	Growth	1,000 SF
Austin	**5.3%**	4,814	Los Angeles	**0.5%**	4,873
Raleigh	**5.2%**	3,455	New York	**0.4%**	6,817
Charlotte	**5.1%**	3,229	Pittsburgh	**0.3%**	376
Orlando	**4.3%**	3,851	Cleveland	**0.3%**	452
Las Vegas	**3.7%**	3,653	Miami	**0.3%**	597
Atlanta	**3.5%**	8,968	Detroit	**0.3%**	649
Palm Bay	**3.0%**	1,658	Hartford	**0.3%**	212
Dallas	**2.9%**	12,077	Honolulu	**0.1%**	47
Phoenix	**2.9%**	5,566	Chicago	**0.0%**	155
Nashville	**2.8%**	2,130	New Orleans	**-1.9%**	(1,355)

National LT Growth Apartment: 1995 - 2006 = 14% (≈ 1.2% Ø per YR); 1987 - 2006 = 25.6% (≈ 1.3% Ø per YR).

Source: PPR, PFEFFER.

4.3.1.5 Characteristics and Development of the Hotel Properties Market

Referring to the 10 largest hotel markets as shown in Figure 48, most of the large markets are either tourist destinations (such as Las Vegas or Orland) or tourist and business/convention destinations (such as New York or Los Angeles). These three groups (tourist, convention, business) are the three demand categories for hotel space.

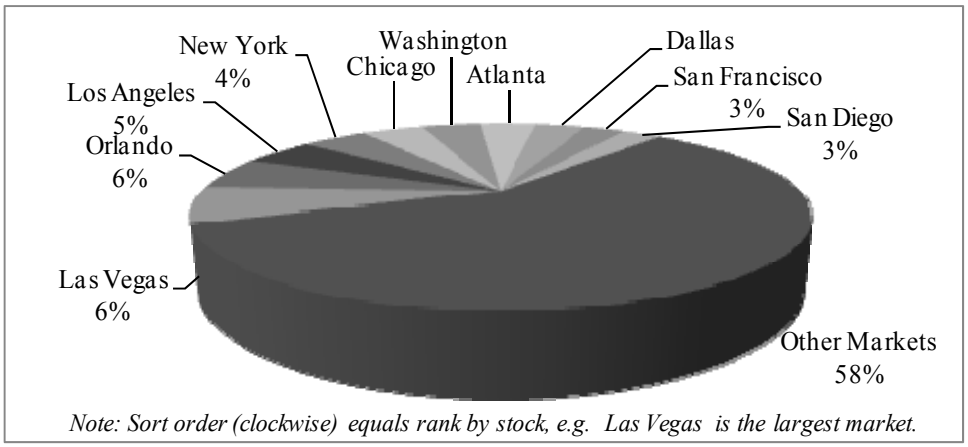
On the supply side, it can be differentiated between urban areas with sometimes high barriers to entry and hotels in nonurban areas with hotels mostly in the mid-, economy, or budget range where supply is less constrained.[243] Since vacation areas are often not located within the large MSA, but in smaller markets, such as Hartford, Birmingham, or Greenville, the overall share of the 10 markets is around 40%. Similar to office real estate, the construction of hotel real estate is more difficult in inner-city areas.

[241] Cf. RE-BUSINESSONLINE (2007), p. 2.

[242] Refer to Figure 144: Multifamily Building Permits Austin, p. 326.

[243] Cf. POORVU, W.J./CRUIKSHANK, J.L. (2000), p. 280.

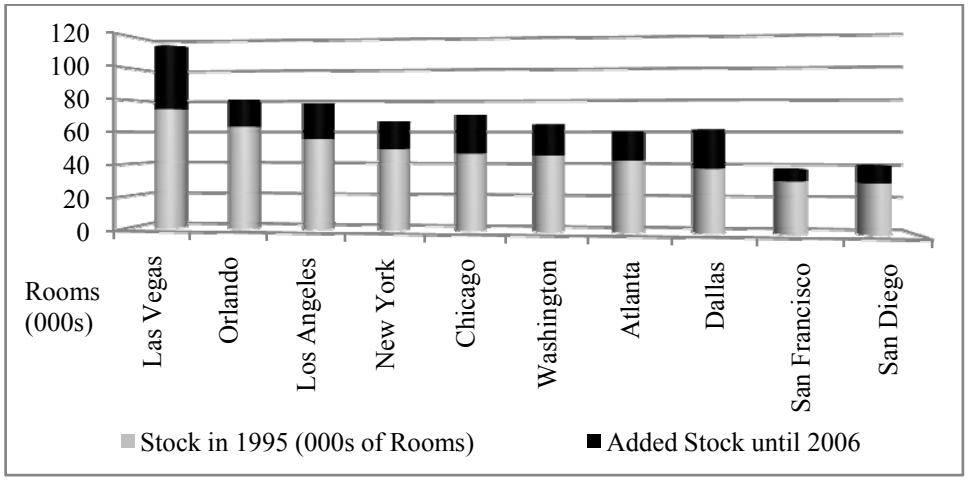
Figure 48: Share of the 10 Largest Hotel Properties Markets



Source: PPR, PFEFFER.

Figure 49 illustrates the stellar growth in the stock of hotel properties. Most markets have significantly increased their stock. For example, the stock of hotel rooms in Las Vegas has grown by 53% over the 12-year period (around 40,000 rooms net). Similarly to Las Vegas, supply in many markets has been driven by demand from tourism, particularly in Orlando, Orange County, or Atlanta. This also implies that these markets are more volatile because tourism is more sensitive to exogenous shocks or economic factors such as GDP development. In contrast, the large hotel markets in Los Angeles, New York, Chicago, or Washington, DC, have a lower degree of supply volatility because these are highly urbanized markets that have a higher population density acting both as a business/convention and tourist destination.

Figure 49: Size and Change of 10 Largest Hotel Properties Markets



Source: PPR, PFEFFER.

Notably, the increase in stock between 1995 and 2006 has been stronger than in the office or industrial segment. This hotel building boom is at least partly the result of product segmentation, meaning that most of the new construction is composed of the limited service and business traveler extended stay varieties. Furthermore, the goal to establish global brands coupled with high profits after the 1991 recession stimulated the construction.[244]

Particularly noticeable, the Texas markets of Austin, Dallas, and Houston have been the fastest-growing hotel markets in the country, nearly doubling their stock over the past decade. Reasons, e.g., for Houston, are its role as a center of the energy industry, as an important convention destination, and as the location of the headquarters of the NASA in the United States.

Table 18: 10 Fastest- and Slowest-growing Hotel Markets – 1995:1 - 2006:4

Market	Growth	1,000 SF
Austin	**6.9%**	686
Houston	**5.9%**	1,406
Charlotte	**5.5%**	642
Dallas	**5.1%**	1,933
Seattle	**5.0%**	978
San Antonio	**4.9%**	726
Las Vegas	**4.5%**	3,303
Raleigh	**4.4%**	450
Jacksonville	**4.3%**	464
Philadelphia	**4.3%**	810

Market	Growth	1,000 SF
Orlando	**2.2%**	1,408
Cleveland	**2.1%**	213
Miami	**2.0%**	506
Virginia Beach	**1.9%**	349
San Francisco	**1.9%**	575
Palm Bay	**1.4%**	121
Sacramento	**1.2%**	154
Detroit	**1.0%**	198
New Orleans	**0.9%**	162
Honolulu	**-1.0%**	(276)

National LT Growth Hotel Properties: 1995 - 2006 = 39.1% (≈ 3.3% Ø per YR).

Source: PPR, PFEFFER.

As a consequence, Houston has grown its hotel stock at a 6% rate, similar to Austin. Other markets such as Seattle have benefited from business growth. In contrast, as shown in Table 18, one market – Honolulu – had negative growth, meaning that part of the hotel stock was taken "off-market." This could happen through conversion, for example, into residences or demolition.

Having analyzed the size, structure, and the change over time in stock, the five property types differ regarding the size of the individual MSA investments, their structure, and importance. Also, the respective MSAs in the sample have developed differently within

[244] Cf. MANSOUR, A./GALLAGER, M. (2000), p. 136.

a particular property type and among the five property types (office, industrial, retail, apartment, and hotel). This illustrates that the various space users have different locational requirements. Furthermore, the supply side (new construction) and the demand side (utility function demand) for space have different characteristics that determine the pace of increase in stock.

4.3.2 Absorption and Demand

The following section illustrates the demand for space in the five property types that are part of this analysis. For reasons of clarity, the section deals only with absorption/demand characteristics on a national level. Since the empirical analysis focuses on vacancy and rent levels as the main indicators for the physical market cycle position of an MSA, these two variables are investigated in greater detail in the following sections. Furthermore, supply and demand are reflected in occupancy rates and rent levels.[245] Also, the section looks at "net absorption."

Net absorption is defined as the net change of occupied space only. Consequently, net absorption is the realized demand, the actual space that is newly occupied. This concept is based on building stock and occupancy rates. For example, hotel net absorption is defined as an estimate of the new number of hotel rooms occupied in hotel properties. Hence, negative hotel net absorption occurs when fewer people book hotel rooms, which could be caused by external shocks, a degrading of the economic development, or demographic changes. Analogically, office net absorption is based on an assumption about the number of office employees in a market and the average space required by one employee. Likewise, retail demand rests upon retail sales and warehouse demand on the related employment and the rented occupied space per capita. Similar but slightly different, hotel demand is predicted on the net number of additional hotel rooms required by three groups of customers (business, convention, and recreational) and is based on a four-quarter moving averaged smoothed series (based on Smith Travel Research Data). Negative net absorption happens when the fundamentals and drivers of

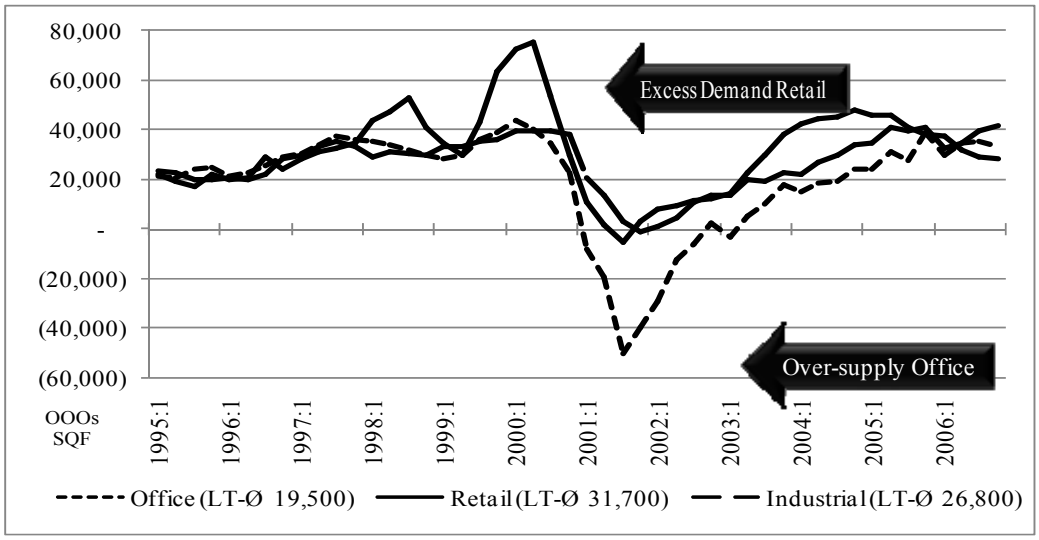
[245] Cf. Chapter 2.1, p. 10 and Chapter 3.1.1: Importance of Real Estate Cycles for , p. 52 for a more detailed description of the complex interaction between supply and demand and their effect on vacancy and rent levels.

hotel room demand decrease, for example, in case of falling income levels, a terrorist attack, or an economic downturn.[246]

4.3.2.1 Net Change of Occupied Office, Industrial and Retail Space

Figure 50 shows that the demand for space in the three property types shown has always been positive except for 2001 and 2002 for office real estate. [247] Clearly, the graph shows the cyclical patterns of the office market after September 11, 2001, and the associated potential terrorism fears. This illustrates the effect of exogenous shocks and the resulting economic recession that impacted particularly the large office markets in New York but also in Chicago and other prominent downtown office markets.

Figure 50: Net Absorption Office, Industrial, and Retail Space



Source: PPR, PFEFFER.

Although demand for retail and industrial real estate slumped as well, both segments broke even during this period, meaning that net absorption was close to 0. Furthermore, it is shown that retail had the highest net absorption during the study period, with around 32 million square feet per year. Especially during 1998 and the period from 1999 until September 11, 2001, retail demand rocketed to a maximum of more than 75 million square feet in the second quarter of 2000. After the events of September 11, 2001, net absorption reached a level in all three property types that is similar to their

[246] Cf. STR (2007b), no page.; The concept of net absorption and demand follows the methodology of PPR (2007a), no page.

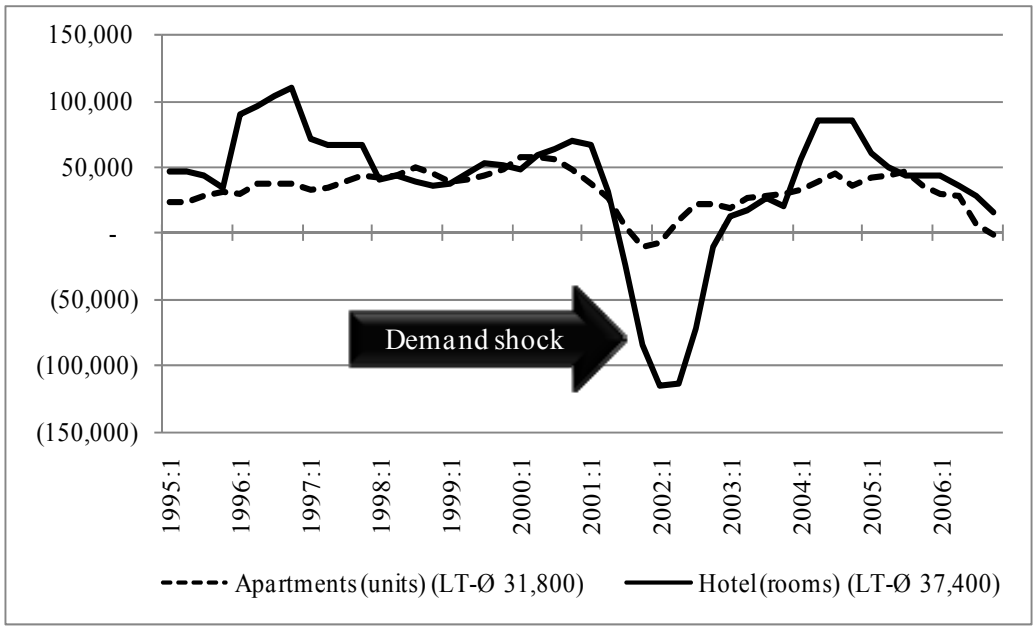
[247] Cf. DERMISI, S.V. (2007); MILLER, N.G., et al. (2003), p. 115.

long-term average growth in net absorption and the time before the terrorist attacks. Moreover, the illustration of the net absorption changes demonstrates that all three property types have common "real estate" fundamentals that affect all three types but also property-type specific factors that affect the demand for these three property types to a different extent.

4.3.2.2 Net Change of Occupied Hotel- and Apartment-Space

Looking at net absorption of hotel rooms and apartment units implies a different measure (rooms and units), as shown in Figure 51. The diagram points up the cyclical behavior of the lodging industry. Taking into consideration that the net absorption is expressed as a four-quarter moving average and not as a quarterly figures such as for the other four property types, the net change of occupied hotel space is even more volatile. The implications and characteristics of hotel demand have been analyzed by various researchers, particularly BARTL/DIBENEDETTO (2003); HESS/LIANG/MCALLISTER (2001); G.W (1999); WHEATON/ROSSOFF (1998).[248] Their research has shown that hotel demand is closely correlated to the overall development of the economy.

Figure 51: Net Absorption Hotel and Apartment Space



Source: PPR, PFEFFER.

[248] Cf. BARTL, H./DIBENEDETTO, R. (2003); HESS, R.C./LIANG, Y./MCALLISTER, R. (2001); G.W (1999); WHEATON, W.C./ROSSOFF, L. (1998).

Due to the nature of hotel real estate, demand reacts faster than other property types to economic changes. Therefore, net absorption is more volatile than demand for apartment real estate, as shown in the diagram. Moreover, the research by LARKIN (2006) showed that demand (and supply) of hotels fluctuates to a high extent depending on external factors that are often unpredictable and that there is no correlation between supply and demand on one side and the costs of running and maintaining a hotel on the other side.[249] This situation aggravates market cycles in this particular property type.

Consequently, the hotel sector was hit hardest by the events of 9/11, and net absorption dropped to a minimum of -113,000 rooms in the second quarter of 2002. Nonetheless, the long-term average increase in net demand was higher than for apartment properties. The demand for apartments, on the other hand, remained relatively constant because the demand for "space to live" is determined by different and more stable fundamentals. Since demographic trends, tax laws, household formation as well as composition, and others fuel the demand for rental apartments, apartment net absorption was not hit to the same extent.

4.3.3 Completions and Supply

Inverse to net absorption, completion is defined as the net change in building stock. Completions data is based on PPR (2007a) and REED (2007).[250] Negative net completions occur when depreciations are higher than the newly added stock during a year. Since hotels often remove part of their inventory from the market for renovations, hotel net completions are often negative and are regarded as net completion in the following year.

4.3.3.1 Net Change in Office, Industrial, and Retail Stock

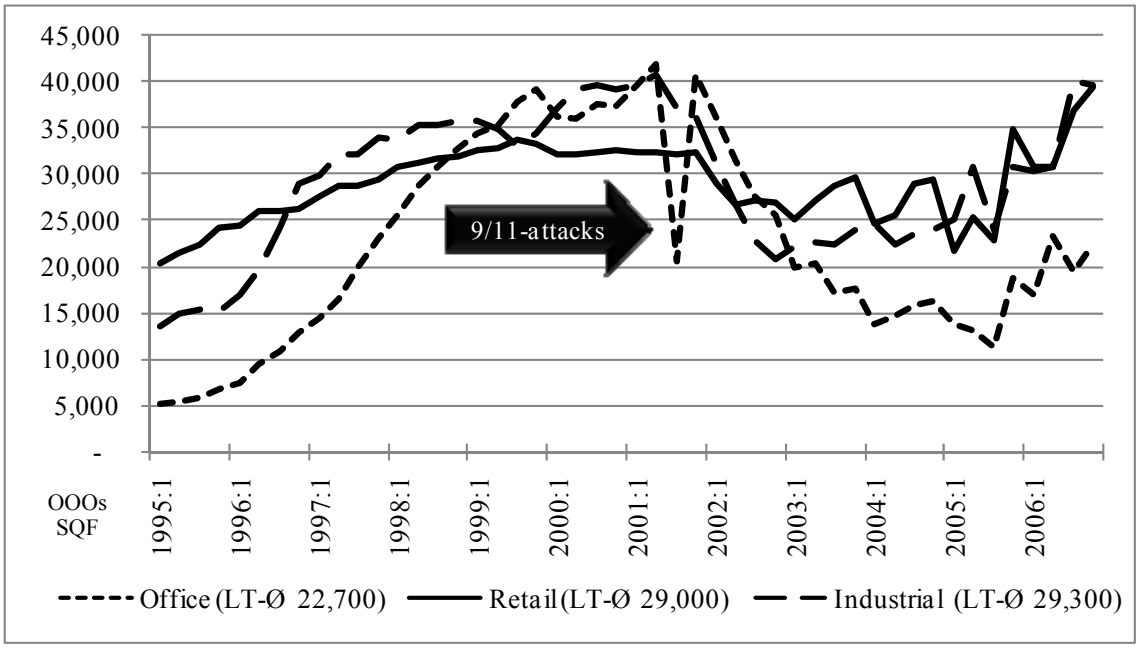
Similar to net absorption, supply increased from a relatively low level in 1995 to a peak that ended in 2001. Clearly, office supply decreased most sharply, from more than 40 million square feet in second quarter 2001 to 20 million square feet in third quarter 2001 because various large urban office projects were stopped. Afterwards, numerous

[249] Cf. LARKIN, D. (2006), p. 24.

[250] Cf. REED (2007), no page; PPR (2007a), no page.

projects were finished in the last quarter of 2001. Since then, the supply of office space declined continuously until the end of 2005, as shown in Figure 52. Again, this illustrates that office real estate was impacted the most of these three property types and took the longest time to recover, from a supply-side perspective. This is reflected in the lower long-term average net supply of office space from an absolute perspective.

Figure 52: Net Supply Office, Industrial, and Retail



Source: PPR, PFEFFER.

Nonetheless, Figure 52 shows that net supply among property types can differ drastically. Furthermore, real estate cycles can differ among property subtypes, particularly for retail real estate as shown by WHEATON/TORTON (1999).[251] This means that the construction cycle for neighborhood and community centers moves more closely with changes in the broader economy while regional and power centers do not have a similar relationship to the broader economy, for example. Despite this fact, the diagram gives an impression of the supply dynamics during the study period. As shown, industrial real estate had a more stable net supply during the period 1995 to 2006.

Analyzing the relationship between construction costs and supply, recent research by WHEATON/SIMONTON (2007) suggested that there is no impact by the real estate development cycle on construction costs. Consequently, the construction industry seems

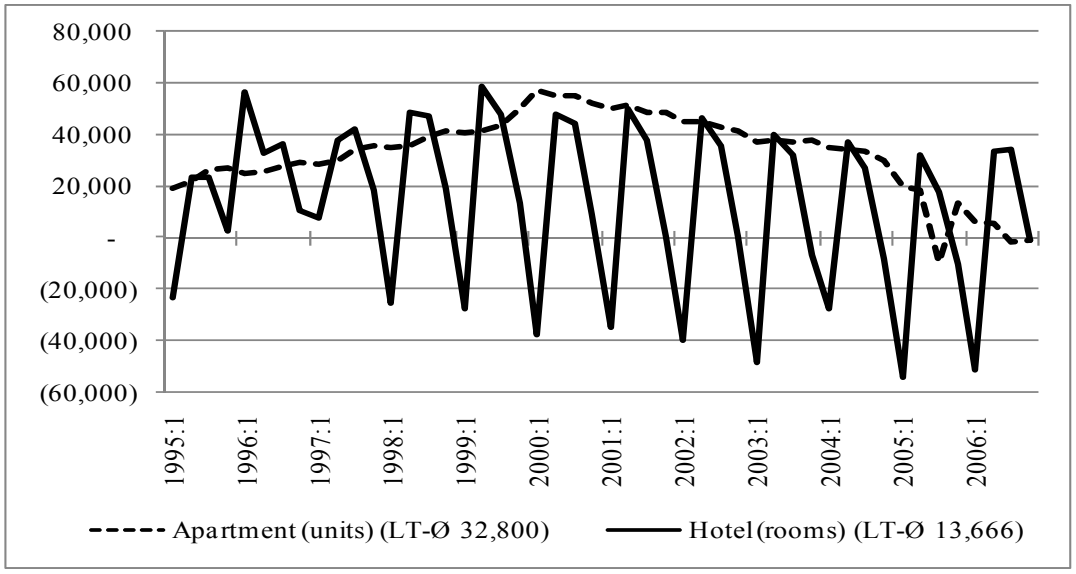
[251] Cf. WHEATON, W.C./TORTON, R.G. (1999), p. 3.

"to be supplied with a very high elasticity to local development demand."[252] To conclude, it is pinpointed that different types of real estate can have quite different cyclical characteristics. Nevertheless, responses to (economic) shocks can be different.[253]

4.3.3.2 Net Change in Apartment and Hotel Stock

Strikingly, the net supply of hotel space is different from the net supply of the other four property types. As described in the preceding section, hotel real estate has different characteristics because of frequent renovations. Thus, hotel real estate varies not only in terms of demand but also in terms of supply characteristics. Figure 53 shows the oscillations of hotel supply around its long-term average of 13,700 rooms.

Figure 53: Net Supply of Apartments and Hotels



Source: PPR, PFEFFER.

The reason for the high variance in terms of net supply for hotel rooms is that some hotel rooms are taken "off" the market to be renovated. Due to the methodology of Property Portfolio Research, Inc., the net supply curve from other research institutes may look different. By contrast, the supply of apartment properties is less volatile. The net additional supply of apartment properties increased continuously until 2001 and

[252] Cf. WHEATON, W.C./SIMONTON, W.E. (2007), p. 16.

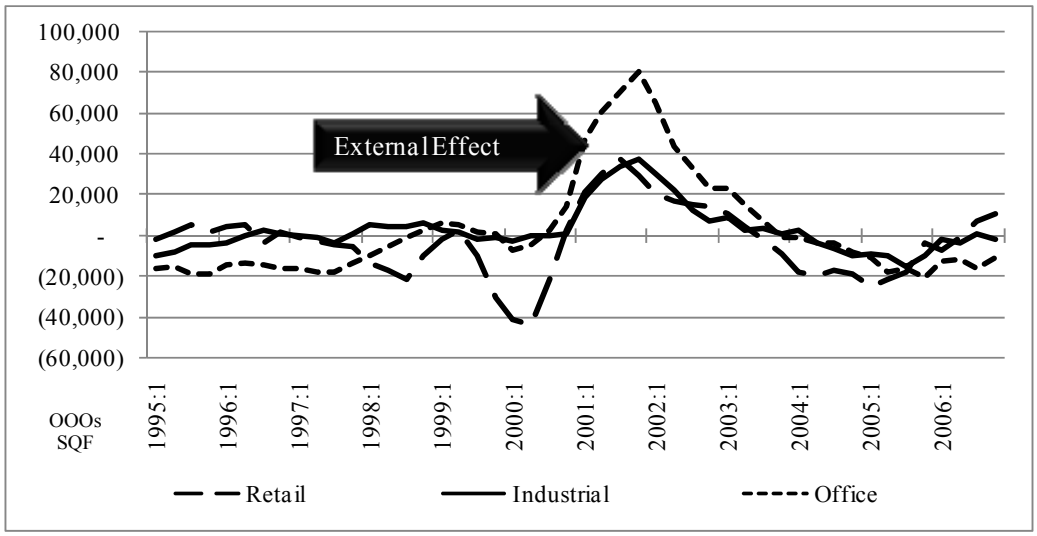
[253] Refer to WHEATON, W.C. (1999) for a more detailed description of differences in real estate cycles among property types.

decreased continuously from then on. The reasons for the decreasing net supply of apartments are particularly the removal of apartment properties from inventory for condo conversion and high home-buying activity.[254] Before 2001, demographic changes such as the changing household competition triggered the construction of new apartments.

4.3.4 Supply and Demand Discrepancies

Market discrepancies, defined as a significant disequilibrium between supply and demand, can result from both a sharp decline in demand and/or a gross excess supply. A positive spread indicates that the supply in terms of net completions is higher than demand in terms of net absorption. Office real estate shows the largest spread between net absorption and net completions during 2001 and 2002.

Figure 54: Net Absorption versus Net Completions – Office, Industrial, Retail



Source: PPR, PFEFFER.

In contrast to other booms and busts in the office sector in the last two decades,[255] this discrepancy appears to be the result of a sharp decline in demand in contrast to supply side forces that propelled the sector to a boom-bust episode. Interestingly, the difference between net supply and net absorption is negative for retail real estate in 1999 and 2000 followed by an oversupply in the following two years.

[254] Cf. BELL, J. (2007), p. 67.

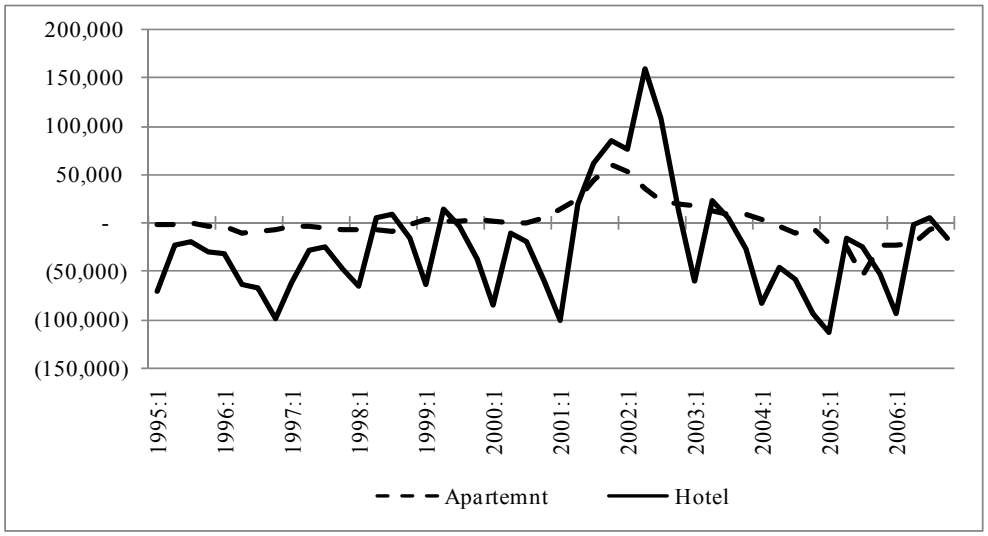
[255] Cf. HESS, R./LIANG, Y. (2003a), p. 12.

Except for these years for retail real estate, and 2001 and 2002 for all three property types, discrepancies have remained within a range of +/- 20 million square feet on a national level. When comparing all three property types, industrial real estate had the lowest standard deviation from the market equilibrium.

Based on net supply and net demand, Figure 55 illustrates the degree to which the hotel sector (similar to the office sector) was hit by the demand shock after 9/11. The discrepancy of about 160,000 hotel rooms over the market equilibrium hit the whole hotel real estate sector, and it took until 2003 before the sector started to recover.

Furthermore, hotel demand and supply spreads oscillate in comparison to apartment properties. Apart from hotel spreads, apartment spreads have remained close to the market equilibrium without large fluctuations, demonstrating the varying demand-and-supply characteristics of these two property types. The effect of these discrepancies on vacancies is dealt with in section 4.3.5.

Figure 55: Net Absorption versus Net Completions – Apartment, Hotel



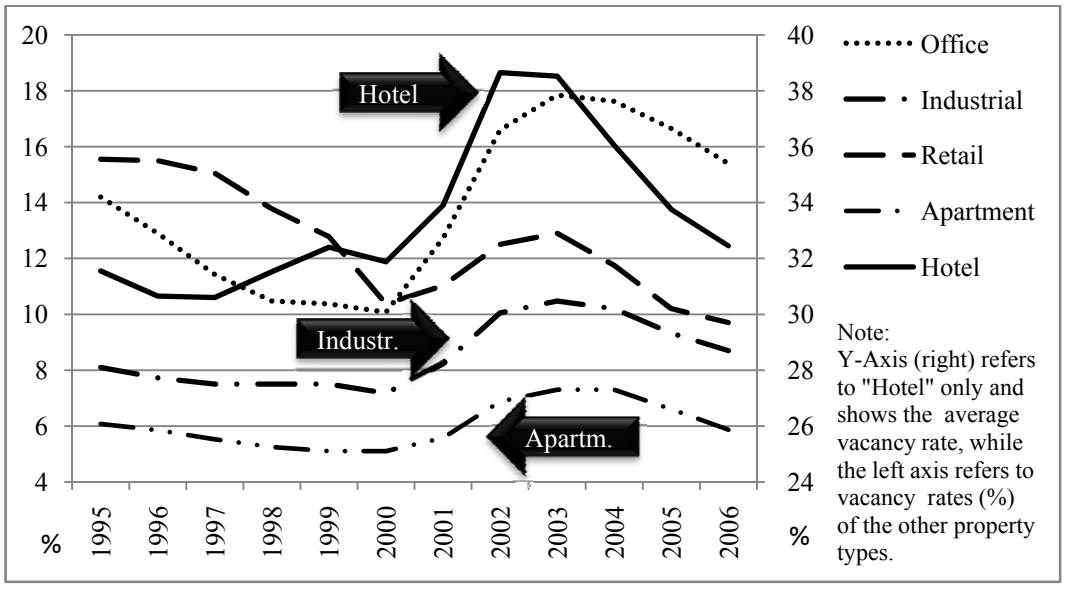
Source: PPR, PFEFFER.

4.3.5 Vacancy Levels of MSAs

The aim of this section is to show the national "vacancy cycle" of each of the five properties that are part of this analysis. Research has shown that every city has its own property cycle that is unique in length and degree of change, depending on the internal

dynamics of each market.[256] Moreover, research by KAISER (1997) showed that the national office cycle has a length of about 10 and 12 years and that there is a marginal rental adjustment mechanism that causes rents to drop approx. 2% for every percentage point of excess vacancy.[257] Therefore, vacancy levels are one of the most important factors of the physical market cycle (for REITs) because the levels have a direct effect on the earnings potential.Before the vacancy levels of the respective property types and individual markets in detail are analyzed, Figure 56 compares the weighted national averages. The vacancy rate for hotel real estate (expressed as the inverse of average room occupancy rates) is significantly higher due to the different characteristics of this property type. Evidently, hotel real estate appears to be more volatile than industrial, retail, and apartment but similar to office real estate.

Figure 56: Overview of Vacancies − National Averages



Source: PPR, PFEFFER.

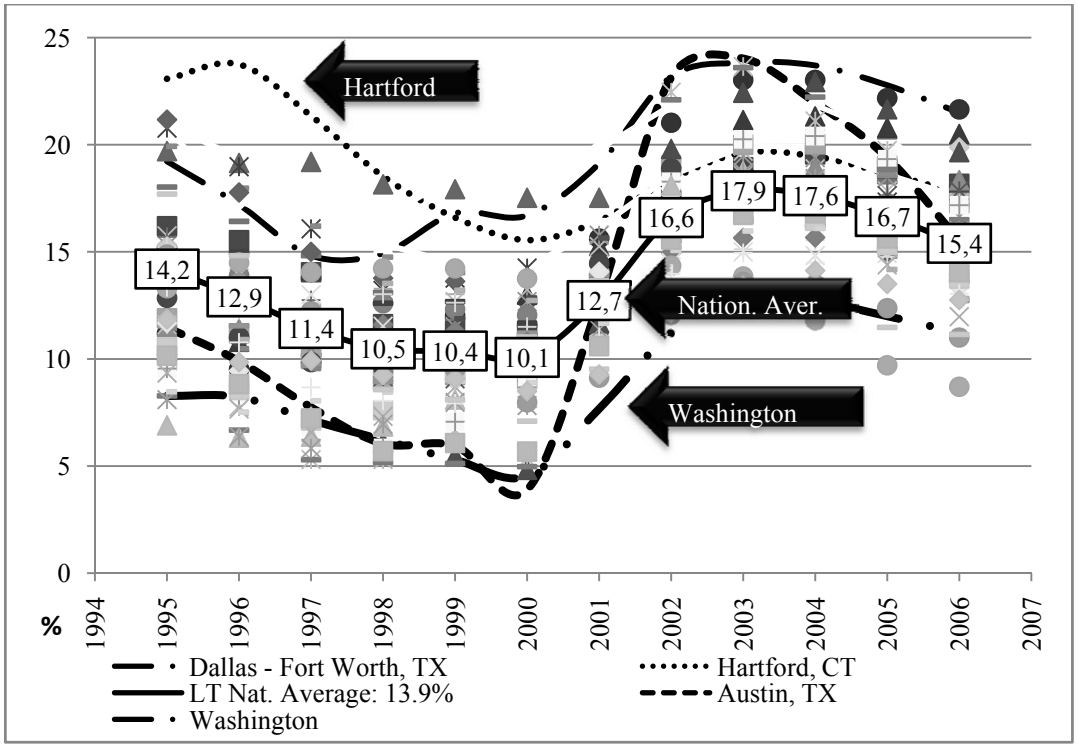
Nonetheless, the diagram illustrates that hotel occupancy reacts faster to changes of the underlying economic drivers of hotel real estates. Apart from the fact, that vacancy rates are more or less exactly 20% higher than for office real estate, the marginal change in percentage points is very similar to office real estate. Furthermore, the economic slowdown in 2000 and the impact of September 11, 2001, affected office and hotel real estate the most. The other three property types, particularly apartment and industrial, had lower and more stable vacancy levels over the study period. Finally, the retail sector

[256] Cf. MUELLER, G.R. (2002), p. 16.

[257] Cf. KAISER, R.W. (1997), p. 233 et seq.

experienced the highest decline in vacancies from 1995 to 2006 of all five property types, with around 6% basis points. Figure 57 clearly shows the cycle office real estate has undergone during the 12-year period. The national average office vacancy ranged from a minimum of 10.1% in 2001 to 17.9% in 2003 with an average of 13.9%. This 12-year average is lower than the 20-year average (1997-2006) of 15.45%, which includes the 1990/91 recession and the savings and loan crisis.[258] In addition to the average vacancy of 13.9%, office vacancies had a standard deviation of 2.8%, which shows how widely spread from the mean the vacancy values in the data set are.

Figure 57: Overview of Vacancy Levels – Office



Note: For reasons of clarity not more than six markets are highlighted (dashed lines), national aver. (box).

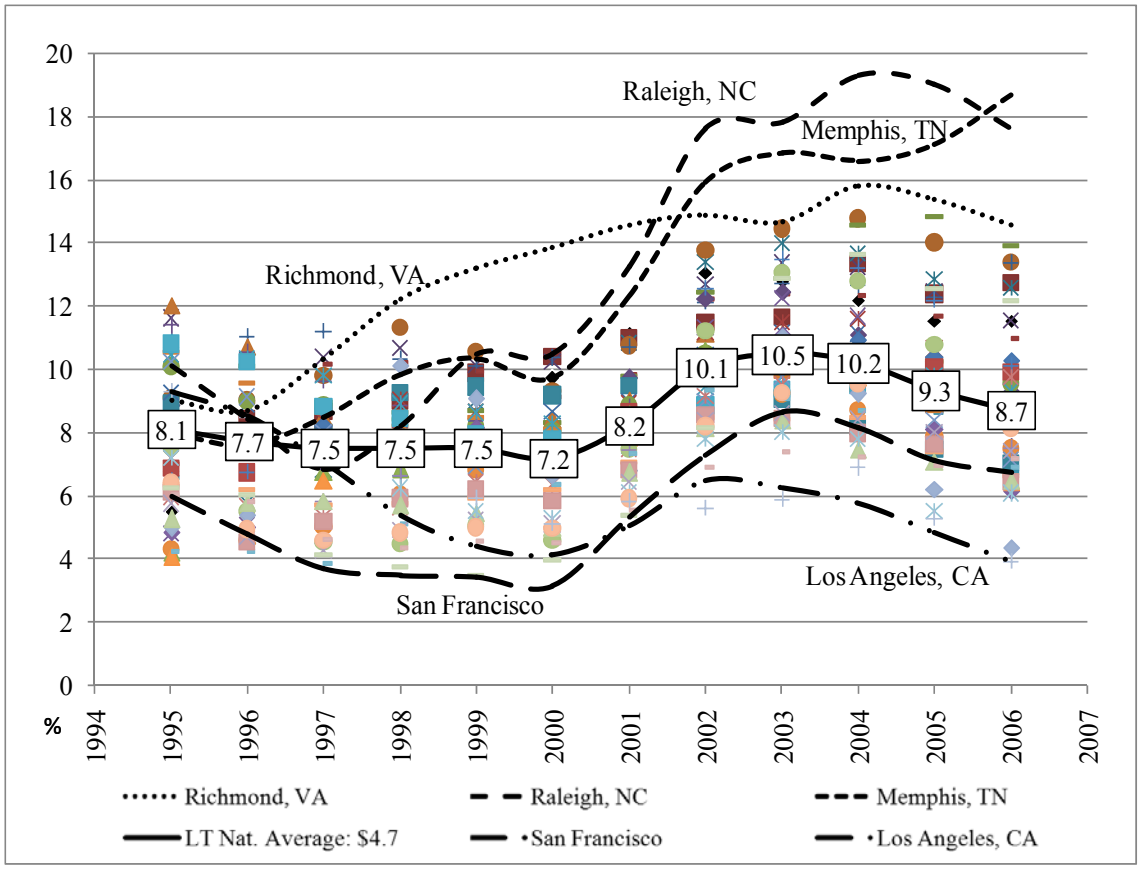
Source: PPR, PFEFFER.

While Figure 57 highlights only four individual markets (Austin, Dallas, Hartford, and Washington, DC) in addition to the national average, these examples illustrate how different vacancy cycles of individual markets can be. Clearly, Washington, DC, is the market with the lowest average vacancy (9.9% on average). Nonetheless, the Washington, DC, market is a mid-fielder in terms of standard deviation from the whole market, with a standard deviation of 2.9%. In contrast, the standard deviation of

[258] Cf. SPIEGEL, M.M. (2002), p 13.

vacancy rates is one of the highest in the country for the Austin market (7%) with a minimum 3.9% vacancy in 2000 and 24% in 2004. Hartford and Dallas, on the other hand, are two of the worst-performing office markets, with vacancies of 19.1% and 19.5%, respectively. In addition, the diagram shows that vacancies vary to a different degree over time. This means that office vacancies were more closely clustered around the national average in 2001 than they were in 1995 or 2006, for example.

Figure 58: Overview of Vacancy Levels − Industrial



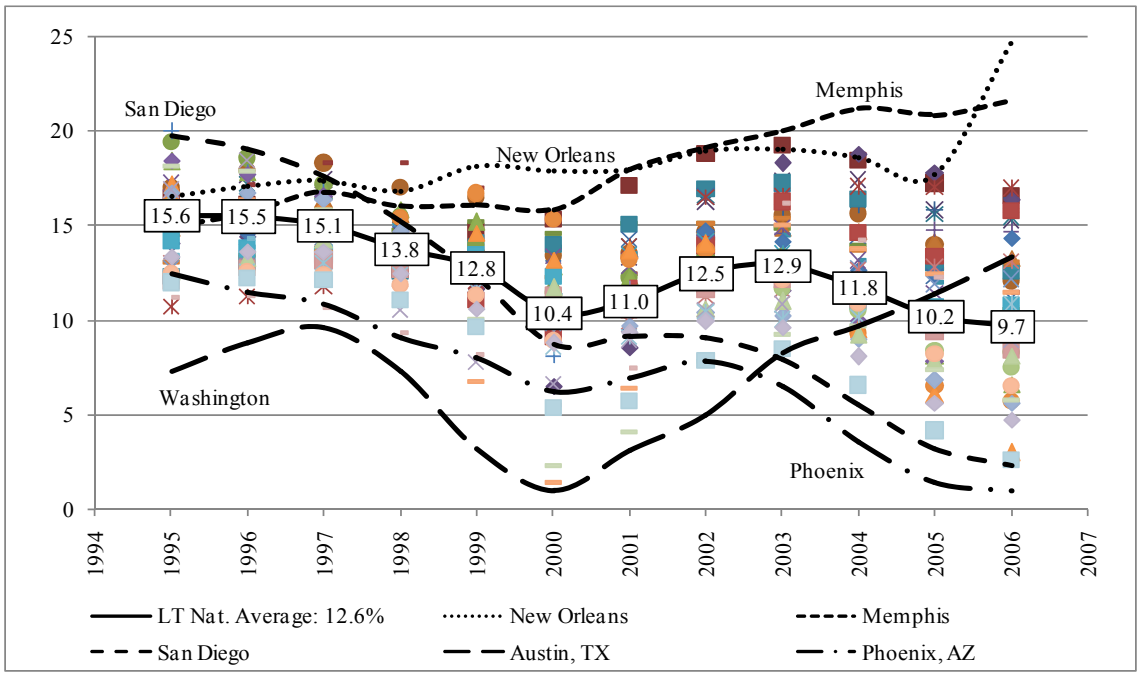
Source: PPR, PFEFFER.

Compared to the office sector, industrial real estate had not only a lower vacancy as expressed by the national average of 8.5% but also a lower volatility in terms of standard deviation (1.2%). This means that industrial real estate is less volatile than office real estate measured by vacancies, which implies that earnings of Industrial REITs should be more stable. Nonetheless, some markets such as Raleigh, North Carolina, Richmond, or Memphis, Tennessee, have seen a constant increase in vacancies, as shown in the illustration. These markets have been faced with a decrease in the demand for storage and demand of goods in contrast to the Californian markets such as San Francisco and Los Angeles that have benefited from an increased demand,

as described in section 4.3.2.1.[259] Raleigh and Memphis also had the highest standard deviation from their mean vacancy. The most stable markets (lowest deviations) are markets with high barriers to entry and a constant and stable demand, such as Washington, DC (0.8%), Honolulu (0.9%), San Diego (0.7%), or New York (0.7%).

Figure 59 illustrates the development of vacancies in the retail sectors. Evidently, vacancies decreased from high levels during the beginning of the study period and increased after the slowdown of the economy in 2001 and 9/11 in 2001 until 2003, when positive fundamentals increased the demand for retail space. On average, the retail sector had a vacancy of 12.6% with a standard deviation of 2%.

Figure 59: Overview of Vacancy Levels – Retail



Source: PPR, PFEFFER.

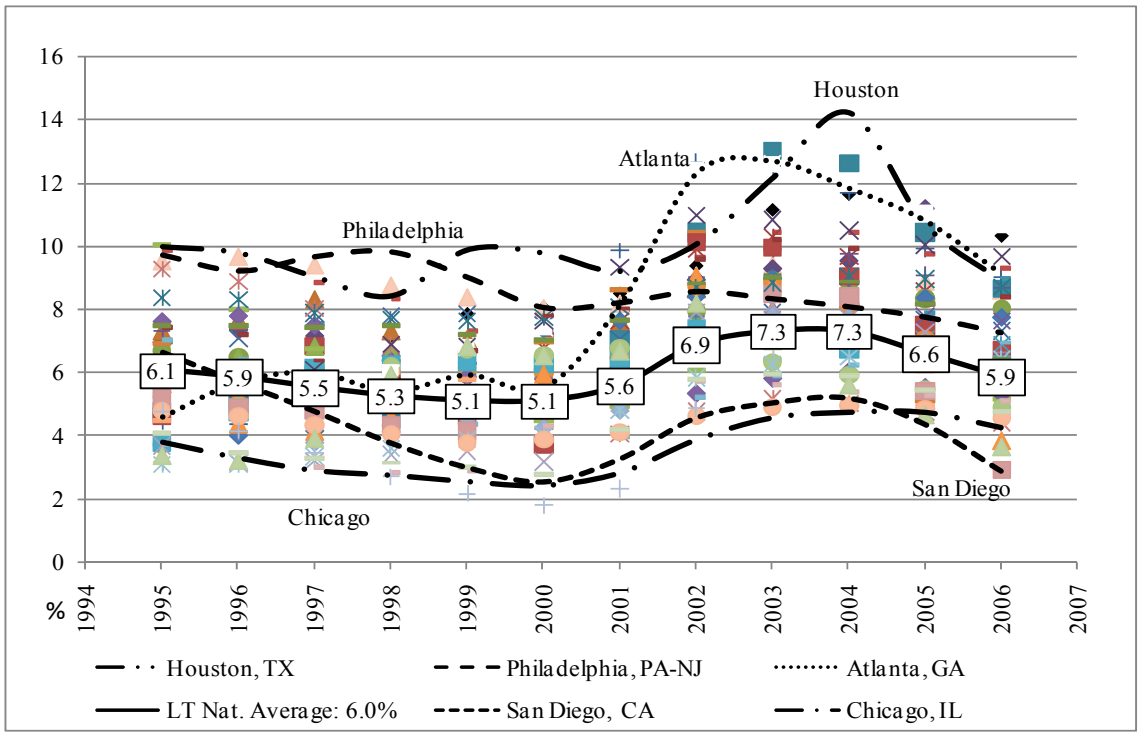
Some markets, however, such as New Orleans, that were hit by an exogenous shock, which led to decreasing household income, disaffection by other cities/states, and a slowdown of the regional economy, experienced a constant vacancy increase. In contrast, San Diego changed from a market with a very high vacancy of about 20% in 1995 to one of the markets with the lowest vacancy in 2006, not showing a significant downturn trend in terms of increasing vacancies. The markets with the lowest average

[259] Refer to Chapter 4.3.2.1, p. 144.

vacancy are Phoenix, (average of 7.1%) with extremely low vacancies in the last three years ranging from 3.5% to 0.9%, and Austin (7.3%) and New York (8.1%).

Thus, the national vacancy figures are lower for the apartment segment with a long-term average of 6% over 12 years. Also, none of the 49 markets exceeded the 15% vacancy level. This illustrates the more stable fundamentals of rental real estate in relation to office and retail real estate. In addition to the very stable and dense urban markets with the lowest vacancies around 4.3% such as San Diego, San Francisco, Chicago, and Boston, the diagram also shows two of the markets with the highest vacancies (Houston, 10.2%, and Philadelphia, 8.6%).

Figure 60: Overview of Vacancy Levels – Apartment



Source: PPR, PFEFFER.

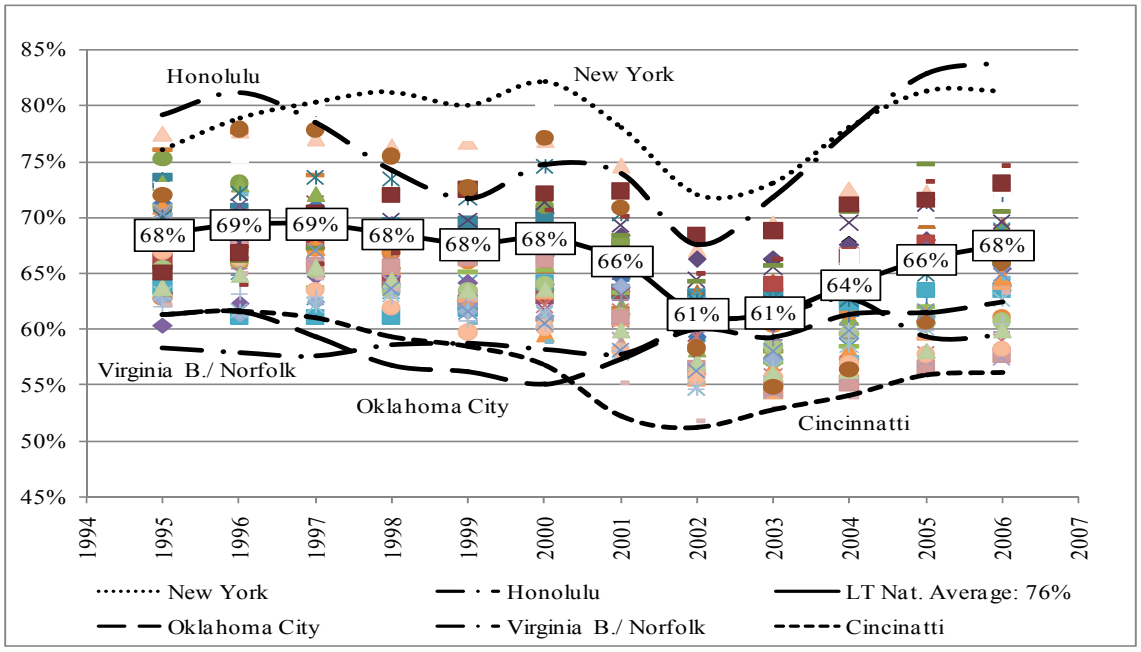
Other markets such as Atlanta have been relatively stable markets close to the national average but experienced increasing vacancies after 2000. Almost every sector experienced a loss in nonagricultural employment such as construction, manufacturing, and transportation-utilities that affected the Atlanta metropolitan area in particular, where employment fell by 60,000 in 2001 alone. Moreover, a large number of apartments were added during a period of declining demand in 2001 and 2002.[260] This

[260] Cf. U.S. Department of Housing and Urban Development (2007), no page.

excess supply in combination with a declining demand made Atlanta one of the weakest markets in the second half of the sample period.

Due to the different performance measures (RevPAR and ADR instead of $/Yr./square foot,[261] occupancy versus vacancy) applied to hotel real estate, Figure 61 shows the average occupancy rate, not vacancy. Since RevPAR is defined as the product of the average daily room rate and the occupancy rate, these two factors are analyzed separately. Nonetheless, RevPAR is preferred as the appropriate measure of the revenue-generating effectiveness of hotel real estate. Compared to the occupancy rates of the other four property types, hotel real estate has higher "vacancies" because of the specific characteristics of the business.

Figure 61: Overview of Vacancy Levels − Hotel



Source: PPR, PFEFFER.

As shown, Honolulu (76%), New York (78%), and Las Vegas (74%) are the best-performing markets with the highest room utilization. These markets have typically traded at a 10%-points premium to the national average (67%). In contrast, the markets with the lowest occupancy are Cincinnati (56%), Virginia Beach/Norfolk (59%), and Oklahoma City (59%), which suffered from decreasing demand from business and

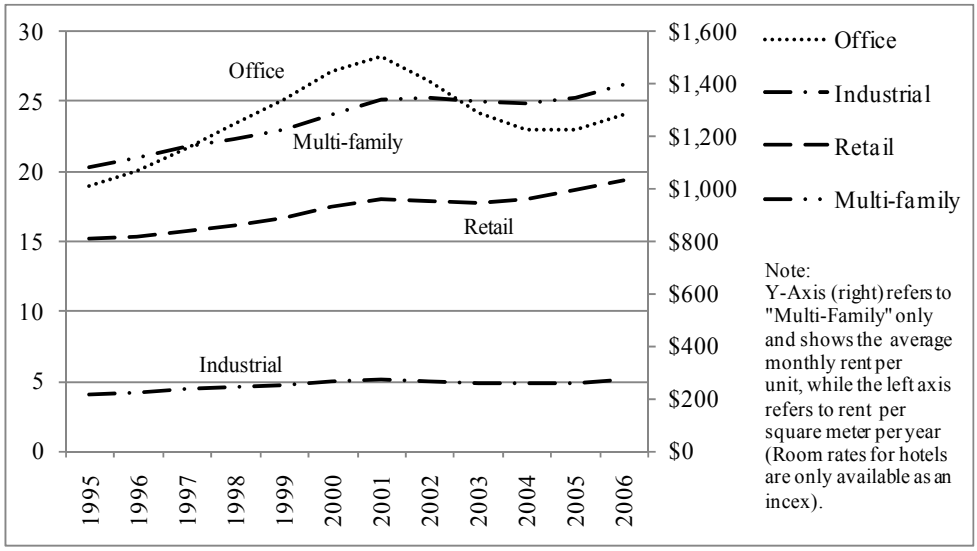
[261] Revenue per Available Room (RevPAR) refers to the revenue generating effectiveness of a hotel property. It is calculated by multiplying the average daily room rate (ADR) by the occupancy rate.

convention travelers. The following section illustrates how these vacancy/occupancy levels are reflected in rent levels.

4.3.6 Rent Levels

The following section aims to give a general overview of rent levels, particularly for the markets that over- or underperformed the national average. These markets are highlighted and examined in further detail, depending on the characteristics of the particular segment. Rents are expressed as dollar per square foot per year for office, industrial, and retail. Hotel rents are defined as the average daily room rate, and apartment rents are compared by dollar per unit per months, as shown in Figure 62. Evidently, all four property types have different rent levels, with office having the highest rents ($23.8 on average): more than four times the amount of industrial rents. Nonetheless, it is shown that office rents were more volatile during the period of investigation than for the other property types, which is analyzed more precisely in the following paragraphs.

Figure 62: Overview of Rent Levels



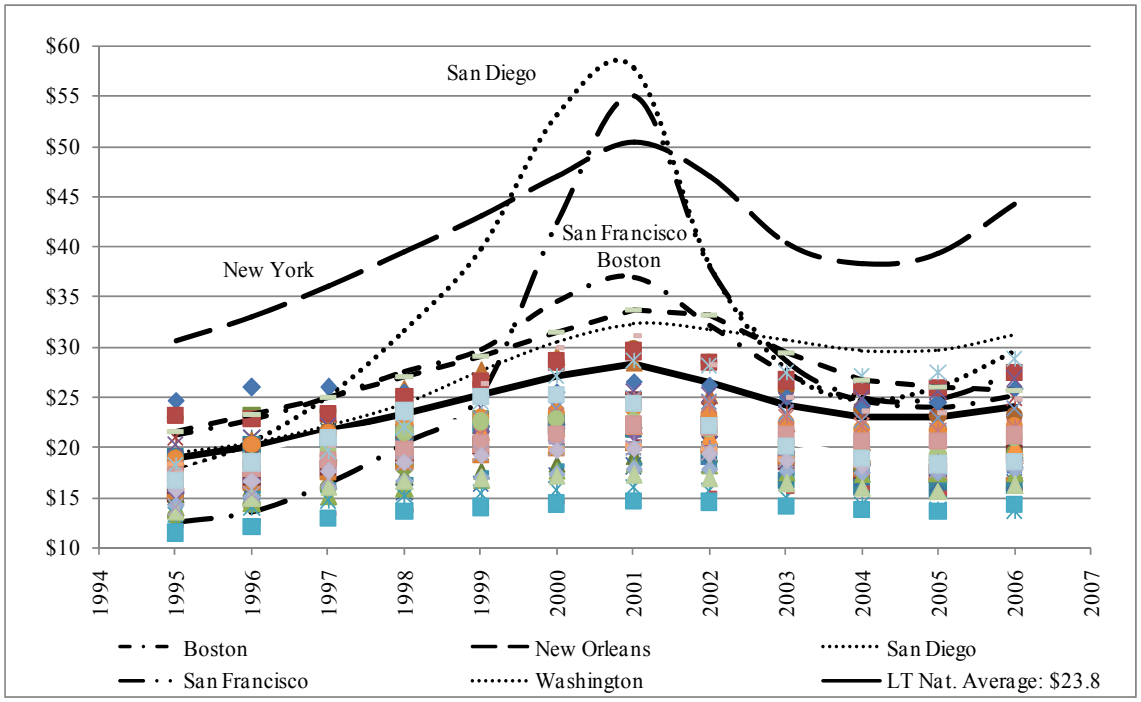
Source: PPR, PFEFFER.

Figure 63 shows that four markets – San Francisco, San Diego, New York, and Boston – had significantly higher rent levels and rent movements that stand out. While rents in New York, as one of the two largest office markets, ranged from $30 to around $50 in 2001, rent levels in San Diego quadrupled between 1995 ($17) and 2001 ($58). At a

similar pattern, rents in San Francisco ranged from $12 in 1995 to $55 in 2001. Notably, Washington, DC, as one of the two largest markets, has a significantly lower rent level than New York, which is more supply constrained.

The sharp decline in office rents started in the second quarter of 2001, which was the biggest decline in nine years, when companies laid off workers and reined in expansion plans amid a slowing economy. The Californian markets such as San Francisco, San Diego, and San Jose were impacted the most by the severe contraction in technology industry employment.[262] This trend accelerated after 9/11 and hit all markets.

Figure 63: Rent Levels − Office



Source: PPR, PFEFFER.

Nonetheless, New York was not hit as hard by the decline in rents as the cities that had benefited most from the New Economy boom. Since these markets are the largest markets for office real estate, as described in the prior chapter, the whole sector was impacted. It took until 2003, when job growth improved the commercial leasing activity and stabilized or increased rent levels.[263] Nevertheless, the San Diego and San Francisco markets were not able to return to a level similar to 2001 until the end of 2006. In contrast, New York office rents increased continuously after 2003 to a maximum of

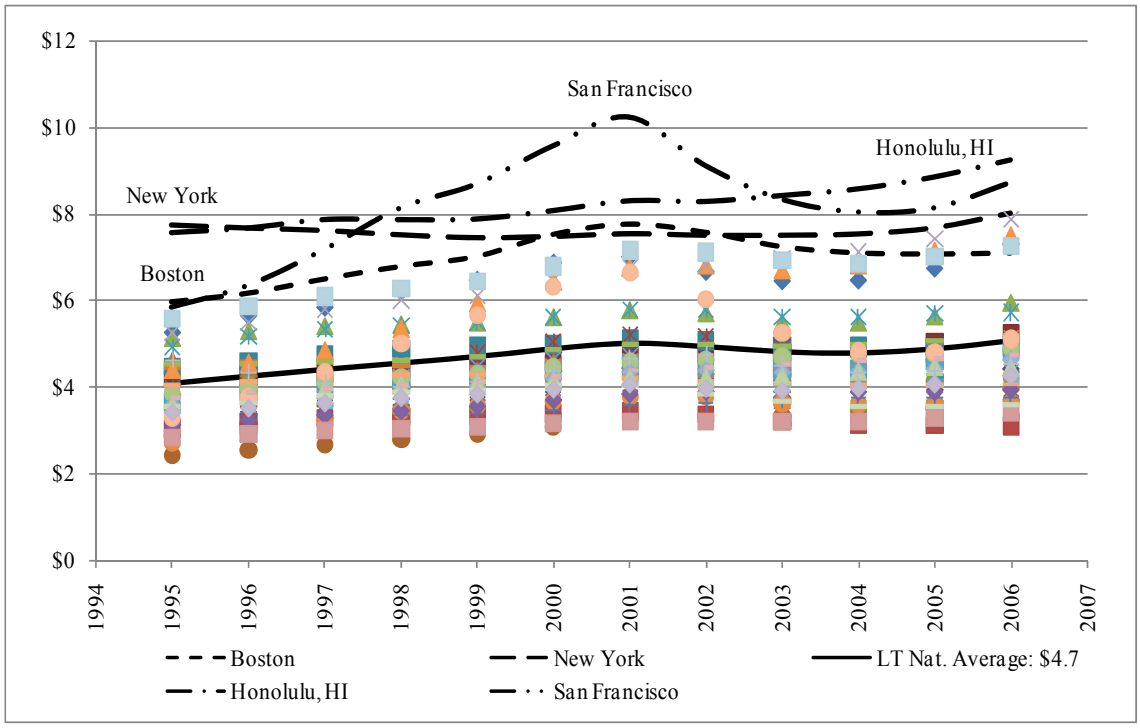
[262] Cf. ANONYMOUS (2001a), no page.

[263] Cf. REALTYTIMES (2007), no page.

$45. Clearly, New York is not only one of the two largest but also by far the most expensive office location in the sample. The national average illustrates the market cycle office real estate has experienced with an average of $23.80.

Switching over to industrial rent levels, San Francisco is the market with the maximum rent level in 2001, benefiting from the boom in the technology industry and trade with China. In contrast to the office market situation, San Francisco was already in 1995 one of the most important and expensive locations for industrial real estate. Notably, New York and Boston, as two of the most expensive industrial markets in 1995, did not deliver the same rental growth rates as San Francisco. This implies that demand in these markets has decreased relative to the Californian markets.

Figure 64: Rent Levels − Industrial



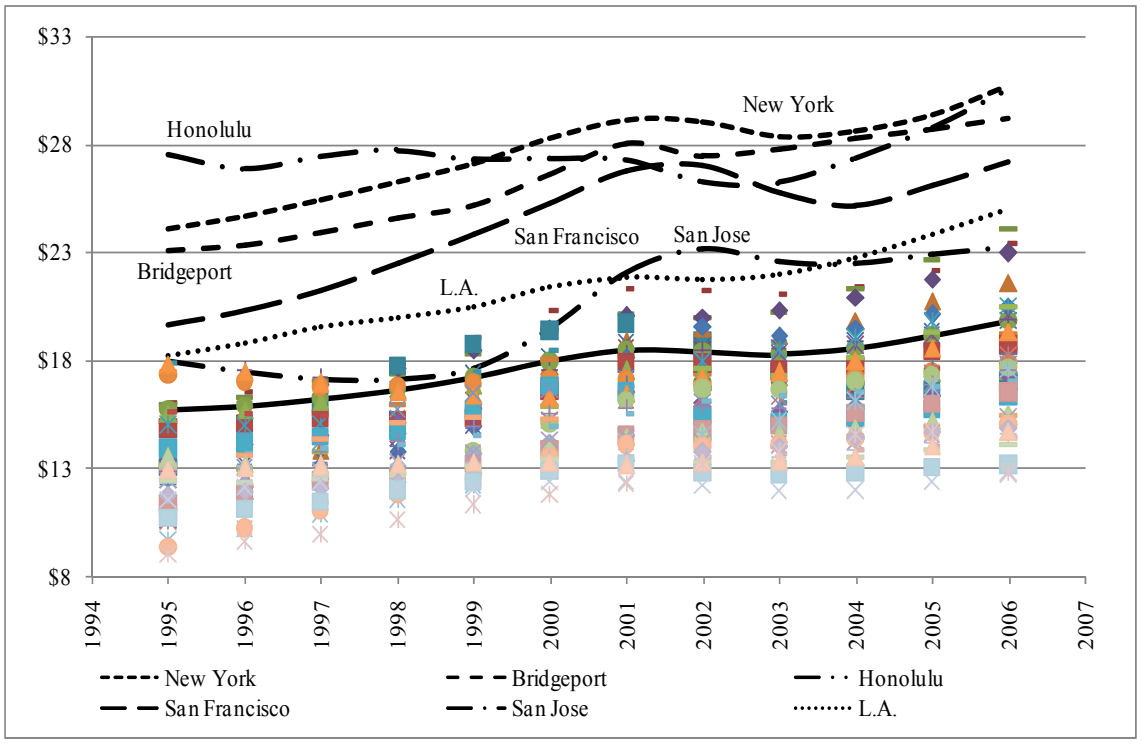
Source: PPR, PFEFFER.

Moreover, Honolulu, one of the smallest markets, was the second-most expensive market on average over the study period. The reasons are very low vacancy rates, caused by the high construction, labor, and raw material costs that constrain the supply of new stock in this market combined with economic growth. The economic growth is bolstered by the strong tourist industry that fuels the demand for retail properties, which boosts the demand for goods and services that are supplied by the industrial sector.

Consequently, demand for warehouses have remained at a very high level and has led to increasing rents.[264]

Again, Honolulu is one of the best-performing markets. As described before, tourism as the main direct and indirect driver on the demand side has fueled the demand for retail properties. On the other hand, supply is more constrained than in other markets. Therefore, Honolulu has established itself as one of the most important retail locations. Large metropolitan cities such as New York and the Californian markets LA, San Francisco, and San Jose that benefited from an increasing population, household income, and economic growth are the most expensive markets. Also, Figure 65 shows that Bridgeport is one of the most expensive retail markets, founded on high household income levels. The national average ranged from $15.2 in 1995 to $19.3 in 2006, representing the positive overall development of retail rents in the country.

Figure 65: Rent Levels − Retail



Source: PPR, PFEFFER.

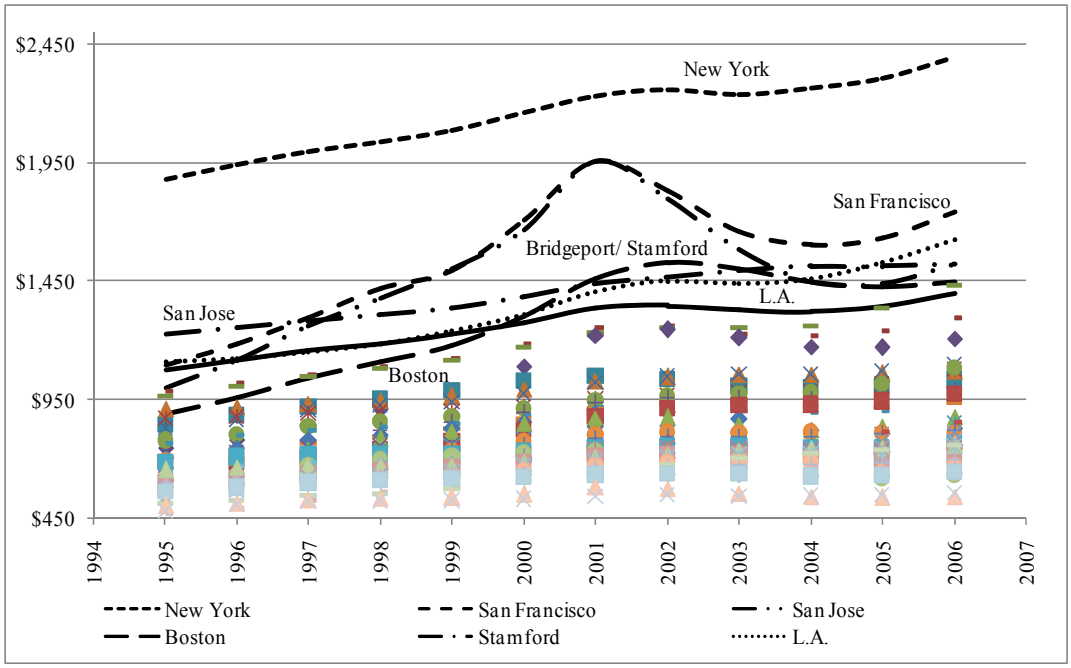
Clearly, New York is by far the most expensive rental market in the United States, with an average rent of $2,150 per apartment/month over the study period, as shown in Figure 66. Also, the apartment market in New York does not show the impact of 9/11,

[264] Cf. COLLIERS (2006), page 2.

in contrast to all other property types. After New York, San Francisco and San Jose are the most expensive rental markets.

Again, the Californian markets show a different dynamic compared to the other markets, being influenced significantly by the boom and bust of the technology and New Economy that is centered there. Due to the high share of the six most expensive markets of the overall rental apartment market, the national average trades above the remaining markets. The long-term average of apartment properties is $1,260 per apartment/month.

Figure 66: Rent Levels − Apartment



Source: PPR, PFEFFER.

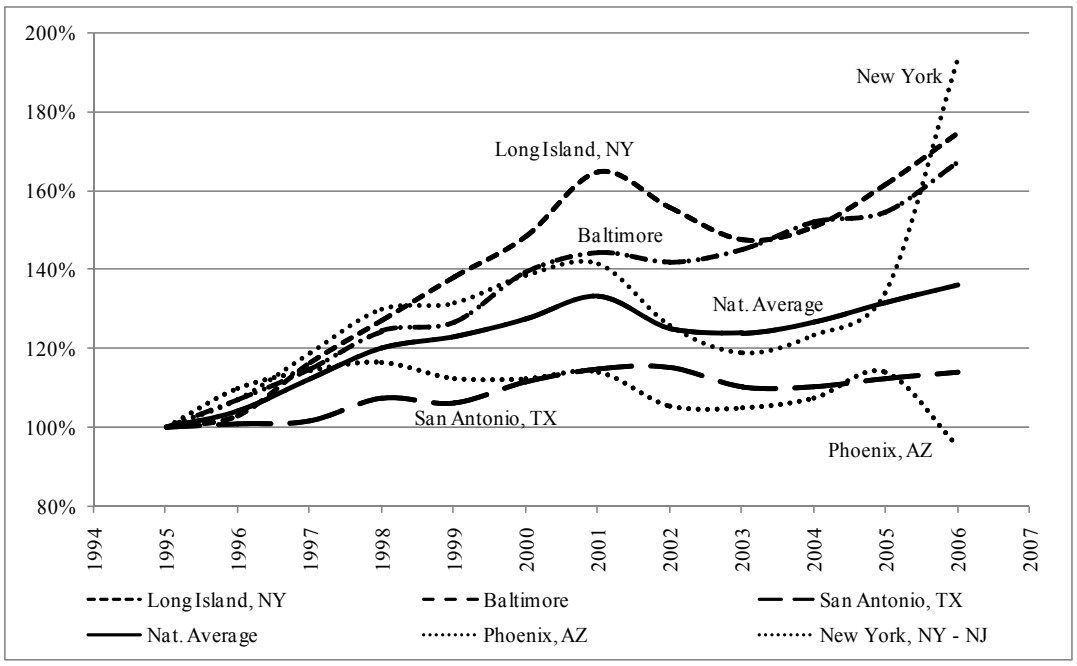
Due to the strong fluctuations and oscillations of hotel room rates and the characteristics of the market cycle data of hotel properties,[265] the three best- and two worst-performing markets in terms of room rates are shown in Figure 67. The data is based on an index that starts in 1995. As illustrated, the average room rates on a national level have increased by around 37% during the study period. Also, the national average shows the decrease in room rates after 9/11.

Nonetheless, markets were affected to a different degree by this exogenous shock. Evidently, the New York hotel market was severely hit by the events but had the highest

[265] Room rates were only available as an index not as a dollar-rate per night.

increase in room rates at the end of 2006 with more than 190%. Phoenix as well as San Antonio were the worst-performing markets measured by the average room rate with Phoenix trading at a lower room rate than in 1995. The second best-performing market measured by the index value in 2006 was Long Island, which benefited from increased tourism, particularly in the premium segment with high room rates.

Figure 67: Room Rate Index − Hotel



Source: PPR, PFEFFER.

4.3.7 Section Summary

Based on the findings in this chapter, there clearly is a need not only for a property type but also for a metro-area specific investigation. Also, the study has demonstrated the following:

- Exogenous shocks such as the 9/11 attacks do not necessarily affect all property sectors (mainly the Hotel and Office REIT sectors in this case).
- Exogenous shocks do not necessarily affect all metro areas, e.g., the crash of the New Economy affected mainly the Californian office markets.
- Property sectors have different "core" markets, such as New York, which is important for office real estate but not for apartment real estate (≈ 1.5%).
- Space markets are not stable, meaning that space market cycles differ on a metro level even within a state.

- Most metro areas follow the overall property type trend but mostly on a different level, have a different volatility, and can have structural breaks in terms of a change from a high- to a low-performing market.
- Hotel real estate is more volatile due to the seasonal component of this property type.
- Office real estate is the second most volatile property type, which implies a higher risk for investors in this property type.

The results in this chapter illustrate the need for REITs to constantly adapt and rebalance their investment strategies in terms of the timing and selection of the markets with higher rent and occupancy growth. In this light, the following chapter investigates what strategies REITs have pursued on sector and company levels that are the basis for their space market cycle performance. Although the investment strategies of REITs have been analyzed on an aggregate level in terms of NCREIF regions, a metro-specific analysis with the same degree of detail has not been conducted before. This is important because it illustrates and highlights company- and sector-specific investment strategies in terms of properties.

4.4 Real Estate Investment Strategies of Real Estate Investment Trusts

The aim of this section is to illustrate the composition, structure, and changes over time of the sample. In this way, the real estate holdings of REIT sectors and companies are analyzed. This is an important part of the study because the structure and size of the underlying real estate assets during the study period are not only the basis but also the connector to analyze the link between REIT performance, property fundamentals, and market cycles. Therefore, the real estate portfolio (represented by the total area and number of units for AP-REITs/number of rooms for HO-REITs per market and per quarter) and the size of the assets are broken down. In contrast to the fundamental analysis in chapter 4.1, which analyzes factors such as market capitalization, this section focuses entirely on real estate assets.

4.4.1 Real Estate Investment Strategies – Sector-level Results

4.4.1.1 Office Real Estate Investment Trust Sector

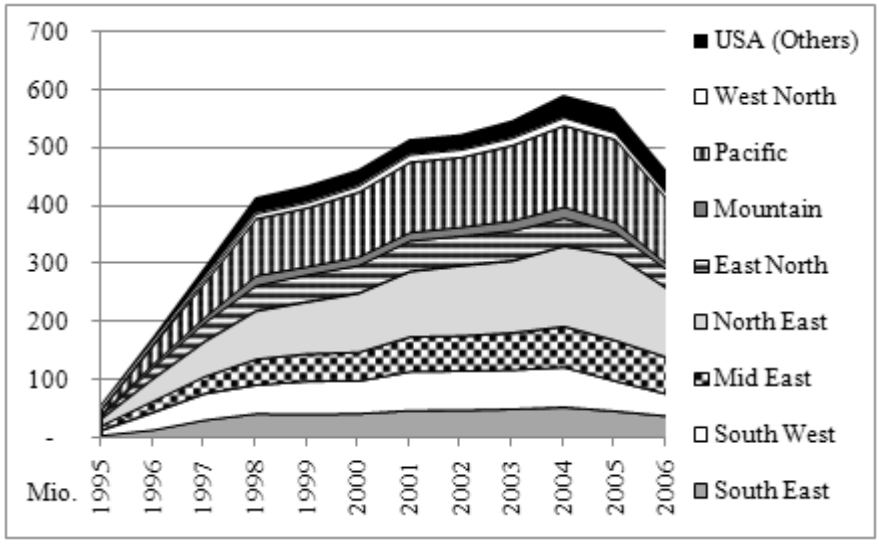
The development of the amount of office space owned by OF-REITs reflects the dynamic development of the REIT industry during the last 12 years, as shown in Figure 68. Especially during the period 1995 till 1998, OF-REITs have more than quadrupled their holdings. As an indicator for the regional allocation, the office area owned is categorized by NCREIF regions for reasons of clarity.[266] The illustration shows that OF-REITs continued their growth between 1998 and 2001 but at a slower pace and continued to grow (measured by office area owned) until 2004.

Starting in 2004, the aggregated area of office space decreased, for example, because REIT companies went private. In particular, the acquisition of Equity Office (EOP) by the private equity firm Blackstone for $36 billion including debt decreased the size of the OF-REIT sector. Equity Office Trust (EOP) went public in 1997 and owned and operated office properties with a portfolio of 580 buildings with a fiscal 2005 delivered revenue of $3 billion.[267]

[266] The actual analysis is based on the 49 markets as described in Chapter 3.3.1, p. 78.

[267] Cf. MARKETWATCH (2007); SNL-DATABASE (2007), no page; Equity Office was one of the largest holder of office real estate in the United States.

Figure 68: Total Office Area Held by Office REITs by NCREIF Region



Source: SNL REAL ESTATE, PFEFFER.

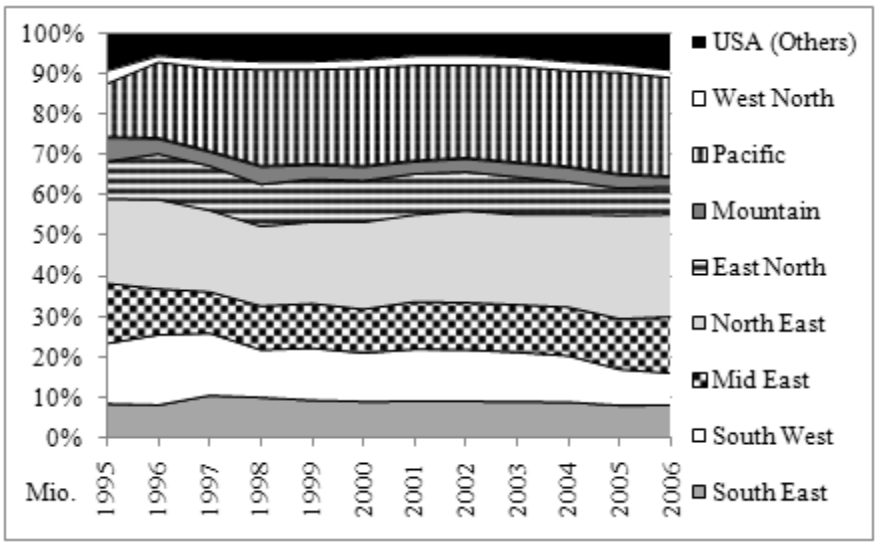
As illustrated by the relative distribution in Figure 69, regional allocation – even based on the aggregate NCREIF classification – is not constant over time. The illustration also shows that OF-REITs are well diversified by regions and invest in all regions. It is important to note that this diagram is a representation of the size of the aggregated office space markets excluding prices.

Furthermore, two regions – the Pacific and the North East – gained in importance for REITs because of larger exposure. Especially, the Pacific and the North East benefited from above-average economic growth rates, which triggered the demand for office space in these areas. The above-average economic performance of these regions may be one of the reasons why REITs have increased their investments in these areas. While the share of office properties in the Pacific region increased from 13% to 25%, the exposure to the North-East region changed from 21% to 26%. It is important to note that the increases happened during different periods. The growth in the Pacific region was realized mainly between 1995 and 1998, and growth was realized between 2000 and 2006 in the North-East region. Looking at the period from 1995 to 1998, one important cause was the New Economy boom that was centered in the California area, where most of the New Economy companies were or are based.[268] The North East benefited from the strong economic performance of the financial sector that is centered in the New York area that increased the supply and demand for office space. In contrast, the share

[268] Cf. MICHALSKI, T./RASCHE, C. (2002), no page for a detailed description.

of other regions such as the South West region decreased by 7% from 15%, and the share of the Mountain region decreased from 6% to 2%.

Figure 69: Pro-rata Office Area held by Office REITs



Source: SNL REAL ESTATE, PFEFFER.

Looking at the descriptive statistics regarding the characteristics of the office properties in the sample, Table 20 specifies the amount of office properties held. Analyzing the development over time, this represents long-term average growth (by No. of Properties held) of about 28% per year, meaning the OF-REITs increased their holdings by one quarter every year.[269] Furthermore, the minimum area of office properties held by OF-REITs may come to the logical conclusion that OF-REITs also bought smaller properties. Referring to the average size of the office properties, the acquisition of smaller office properties holds true for the period 2001 to 2006.

This may be explained by decreasing cap rates and the increased competition in the investment market for commercial properties, especially office properties. Dissecting the period before 2001 shows a different picture with a nearly steady increase in average size. These results are supported by the development of the median size and standard deviation (by size) of office properties. Reasons may be the stellar performance of the REIT market during this period that allowed REITs to acquire large assets due to the favorable capital market environment.

[269] The percentage calculated here is a theoretical number that is biased to a certain extent by going publics. Nonetheless, it gives an indication of the sharp growth of the (Office) REIT industry has undergone.

Table 19: Descriptive Statistics Office Properties in Sample

Square Feet	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Buildings (#)	387	1,016	1,731	2,506	2,682	2,771	2,867	2,954	3,357	3,901	3,967	3,569
Total Area (Mio)	57.8	173.2	293.7	415.6	436.0	463.8	516.6	525.0	549.3	593.1	569.6	463.7
Average (´000)	149	171	170	166	163	167	180	178	164	152	144	130
Std. Dev. (´000)	187	232	230	236	232	240	265	267	264	252	243	229
Median (´000)	84	99	99	97	96	99	101	99	88	78	75	67
Max (´000)	1,205	4,257	4,286	4,286	4,286	4,286	4,286	4,348	4,348	4,348	4,348	4,348

Source: SNL REAL ESTATE, PFEFFER.

Switching from NCREIF regions to metro areas, Table 20 shows the 10 largest metro regions that OF-REITs invested in. On average, most office properties are concentrated in the New York, Los Angeles, and Washington, DC, area, representing more than 25% of all office properties owned. Also, the Top 5 metro areas cover more than 40% and the Top 10 markets more than 60 accordingly. The amount of office size that is not located in one of the MSAs is summarized under the category "USA (Others)," representing less than 7% of the total sample size.

Table 20: Top 10 Metro Areas by Office Area Owned – LT-Average 1995-2006

No	MSA Metro Area	Weight	Accumulated
1	New York-Northern New Jersey-Long Island	13.6%	**Top 5:**
2	Los Angeles-Long Beach-Santa Ana, CA	8.7%	**43%**
3	Washington, DC-Arlington-Alexandria	7.6%	**Top 10:**
4	USA (others)	6.9%	**66%**
5	Dallas-Fort Worth-Arlington, TX	6.2%	**Top 15:**
6	Boston-Cambridge-Quincy, MA-NH	5.4%	**80%**
7	Chicago-Naperville-Joliet, IL-IN-WI	5.0%	
8	Houston-Sugar Land-Baytown, TX	4.4%	
9	San Francisco-Oakland-Fremont, CA	4.3%	
10	Atlanta-Sandy Springs-Marietta, GA	3.9%	

Source: SNL REAL ESTATE, PFEFFER.

It is important to distinguish that the percentages shown in Table 20 are aggregate figures over the whole study period and changed over time while the empirical analysis is based on quarterly and yearly figures. Nonetheless, the table gives an illustration of the most important markets of OF-REITs in the context of this analysis. Investigating the degree of concentration (by NCREIF regions and markets) with the help of the Herfindahl index, it is shown that the degree of concentration in the sample is relatively low. In this context, the changes are based on the individual acquisitions and sales of

individual REITs, for example– BXP Boston Properties, which bought more than 22 buildings between 2001 and 2007.[270]

Table 21: Degree of Concentration by MSA and NCREIF Region – Office

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
By NCREIF	0.13	0.15	0.15	0.15	0.15	0.16	0.16	0.16	0.16	0.16	0.17	0.17
By MSA	0.06	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06

Source: SNL REAL ESTATE, PFEFFER.

Thus, no region or market dominates the sample. This also shows that the OF-REIT sector is broadly diversified across markets with only one market having a share larger than 10%. [271] Furthermore, the degree of diversification on an MSA level and the fact that MSAs have different market cycles triggers the need for a separate analysis of individual markets and the characteristics of the underlying assets that is described for IN-REITs in the next section.

4.4.1.2 Industrial Real Estate Investment Trusts Sector

The IN-REIT sample illustrates the outstanding growth of this REIT sector from 50 million square feet in 1995 to more than 540 million square feet in 2006, as shown in Figure 70. Compared to the office properties sample, the sharp increase in sample size took place in two periods (1996-98 and 2001-02) instead of one (1995-98). In contrast to the Office REIT sample, the industrial properties sample was not affected by large numbers of companies going private, as the OF- and AP-REIT sector was. Moreover, the market exposure is obviously different, and a larger percentage of properties is not located in one of the 48 U.S. metropolitan areas.

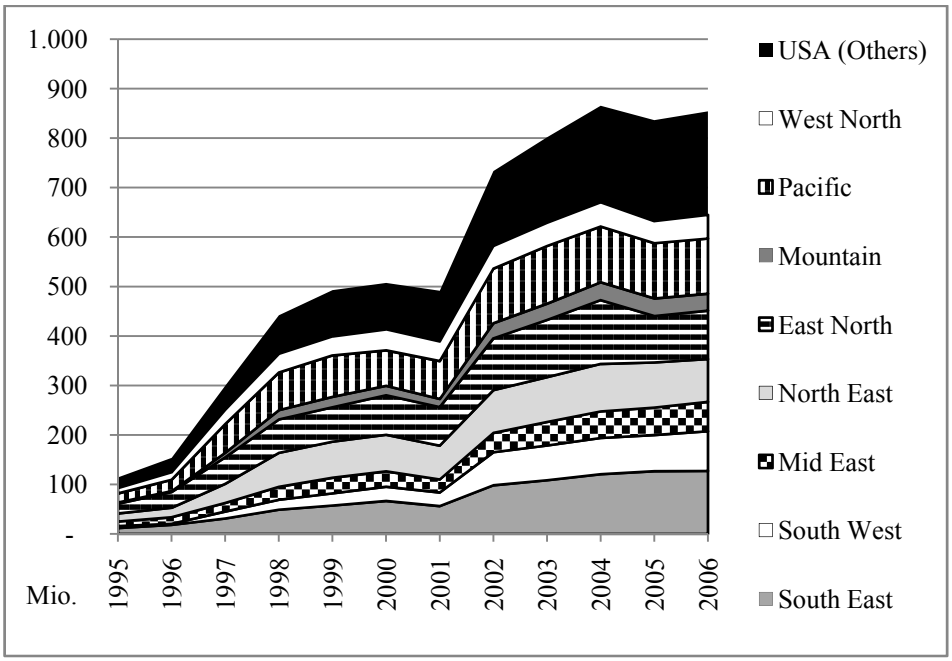
The development of the sample demonstrates the stellar growth of IN-REITs that benefited over the years from improving space demand and higher rents, which were caused by economic growth and increased trade especially with Asia. Furthermore, industrial production as well as employment and income have increased over the study period in favor of this sector. The main demand drivers for the growth in size were

[270] The company also sold more than 25 buildings during that period.

[271] The Herfindahl or Herfindahl-Hirschman Index is a measure of the size in relationship to the overall sample and an indicator of the amount of concentration among them. It is an economic concept that is defined as the sum of the squares of the overall shares of each individual firm or asset in this case. As such, it can range from 0 to 1 (the closer to 1 the higher the degree of concentration and vice versa).

increased shipping and technology changes in distribution facilities, which triggered the demand for efficient logistic facilities.[272]

Figure 70: Total Industrial Area held by Industrial REITs



Source: SNL REAL ESTATE, PFEFFER.

As shown in Figure 71, the geographic exposure of industrial properties is significantly different from office properties. While office properties are mainly located in California and the New York and Boston areas, industrial properties are centered along the "Path of Goods Movement,"[273] namely the large air hubs and ports, for example, on the Pacific Coast or in Chicago.[274]

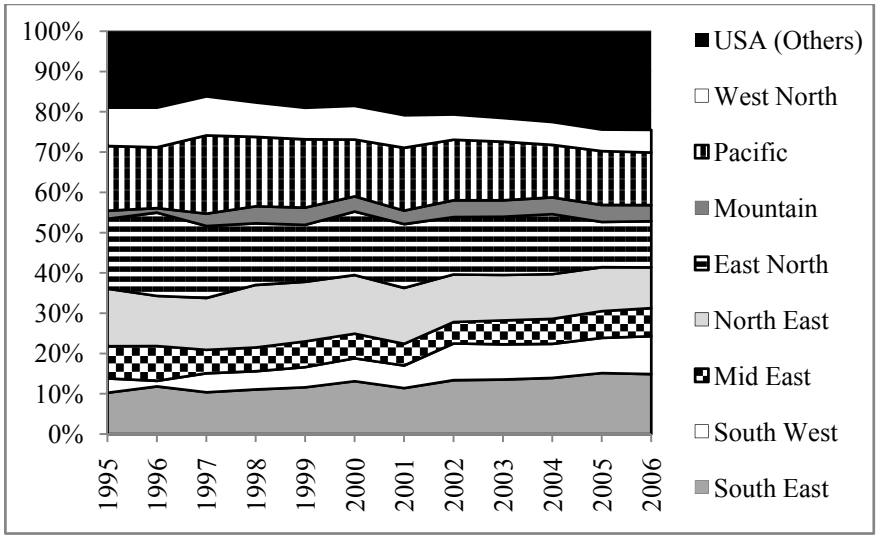
Interestingly, the NCREIF regions that benefit the most from trade with China showed strong growth; for example, the share of the Pacific region doubled from 7% to 14% within a 10-year timeframe. On the other hand, "traditional" regions, e.g., the North East, where a large share of industrial production takes place, have decreased in importance (from 29% to 17% in 2006). These changes mirror the dynamic change in the IN-REIT sector during the last decade.

[272] Cf. GERING, A. (2007), no page.

[273] Cf. MUELLER, G.R./MUELLER, A.G. (2007), p. 45.

[274] Cf. CASWELL, W.S. (2007), no page.

Figure 71: Pro-rata Industrial Area Held by Industrial REITs



Source: SNL REAL ESTATE, PFEFFER.

Looking at the descriptive statistics of the industrial properties sample in Table 22, the amount of properties increased roughly eightfold over the decade. The change in "Average Area" of the properties demonstrates the continuous growth in the size of distribution facilities caused by technology changes in the segment.[275] This is verified by the median of the industrial properties changing from 71,000 square feet in 1995 to 103,000 square feet in 2006. Furthermore, the standard deviation from the average size decreased from 2001 to 2006, meaning that the industrial properties in the sample have become more uniform in terms of size in adapting to the demand for large-scale distribution facilities.

Table 22: Descriptive Statistics Industrial Properties in Sample

Square Feet	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Buildings (#)	1,004	1,331	2,471	3,630	3,967	3,969	3,573	5,541	5,639	5,825	5,383	5,436
Total Area (Mio)	114.3	153.7	299.5	442.1	492.9	507.4	491.5	733.6	801.8	865.5	836.4	854.1
Average (´000)	114	115	121	122	124	128	138	132	142	149	155	157
Std. Dev. (´000)	127	129	157	162	164	184	196	187	200	206	213	201
Median (´000)	76	76	72	71	73	73	78	81	86	89	93	96
Max (´000)	1,217	1,354	2,496	2,811	2,811	4,047	4,047	4,047	4,047	4,047	4,047	3,628

Source: SNL REAL ESTATE, PFEFFER.

Looking at the Top 10 markets by amount of square feet owned illustrates the differences in regional focus of industrial properties. Most obviously, the largest market is "USA (Others)," which appears to be evident since industrial properties are not

[275] Cf. LUTZ, W. (2002), no page.

necessarily located in metro areas. Nonetheless, the majority of warehouses and distribution facilities included in the sample are in one of the 48 MSAs. Additionally, it is shown that the large air and port hubs, such as Chicago or the LA–Long Beach–Santa Ana MSA, have the largest share. Also, the accumulated figures show a similar distribution as in the OF-REIT properties sample, with the Top 10 markets representing three quarters of the overall market.

Table 23: Top 10 Metro Areas by Industrial Area Owned – LT-Average 1995-2006

No	MSA	Weight	Accumulated
1	USA (others)	17.5%	**Top 5:**
2	Chicago-Naperville-Joliet, IL-IN-WI (Metro)	15.1%	**47%**
3	Los Angeles-Long Beach-Santa Ana, CA (Metro)	5.4%	**Top 10:**
4	Atlanta-Sandy Springs-Marietta, GA (Metro)	4.8%	**65%**
5	Dallas-Fort Worth-Arlington, TX (Metro)	4.7%	**Top 15:**
6	New York-Northern New Jersey-Long Island	4.5%	**76%**
7	Minneapolis-St. Paul-Bloomington, MN-WI (Metro)	3.9%	
8	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD (Metro)	3.7%	
9	San Francisco-Oakland-Fremont, CA (Metro)	2.9%	
10	Detroit-Warren-Livonia, MI (Metro)	2.7%	

Source: SNL REAL ESTATE, PFEFFER.

These results are verified by the analysis of diversification within the sample. As expressed by the concentration indices for NCREIF regions and MSAs, the degree of focus is relatively low. Furthermore, the concentration by region reveals that IN-REITs have become more diversified by NCREIF regions. This is mainly caused by a decrease in market share of the East North NCREIF regions, as described earlier in the section.

Table 24: Degree of Concentration by Metro Area and NCREIF Region – Industrial

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
By NCREIF	0.14	0.15	0.14	0.14	0.13	0.13	0.14	0.13	0.14	0.14	0.14	0.14
By MSA	0.08	0.08	0.06	0.07	0.07	0.07	0.08	0.07	0.07	0.08	0.08	0.08

Source: SNL REAL ESTATE, PFEFFER.

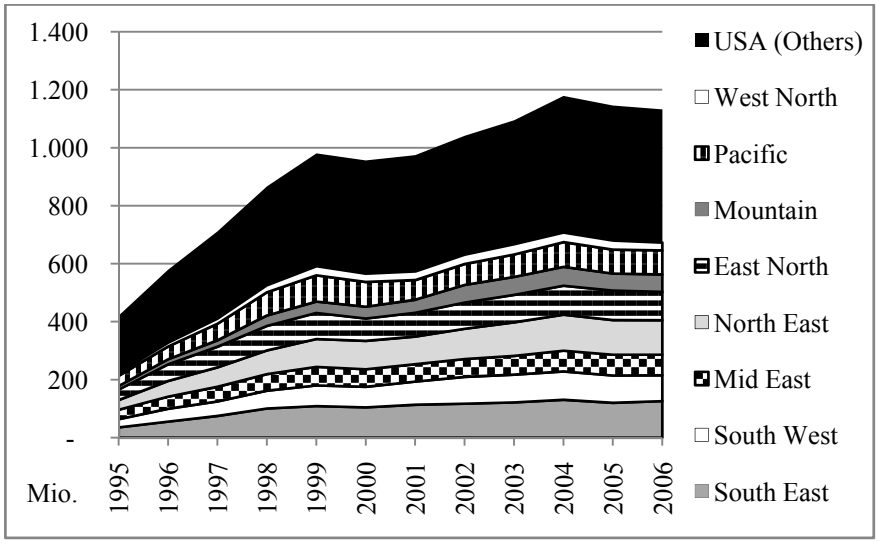
Moreover, industrial real estate markets are segmented, for example, into distribution or production, and the design and capacity of industrial properties are important for the financial success of a building. This factor is more important for industrial properties than for more "standardized products" such as office space. Therefore, industrial properties must be flexible for capacity and technology expansion. IN-REITs and companies such as ProLogis or AMB Properties Corporation have seized technology

shift opportunities and were able to significantly increase the size of their portfolios, as reflected in the IN-REITs sample.

4.4.1.3 Retail Real Estate Investment Trusts Sector

Looking at the growth of the holdings of RE-REITs during the study period, most of the increase in gross lettable area took place between 1997 and 1998, when several companies in the retail sector went public and chose REIT status. As a consequence, the size of the RE-REIT segment nearly doubled in one year. On average, the RE-REIT sector grew by around 5.90 million square feet of retail space per year. Furthermore, the RE-REIT sector is the largest sector by size of the underlying assets in the sample.

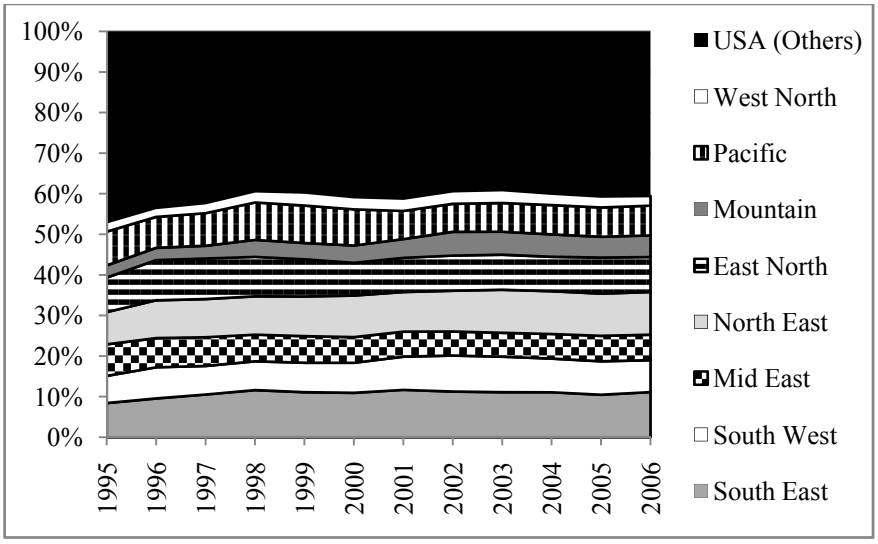
Figure 72: Total Retail Area Held by Retail REITs



Source: SNL REAL ESTATE, PFEFFER.

Analyzing the RE-REIT sample, it can be noted that this sector has the highest share of properties that are not in one of the 48 MSAs. This is due to the location characteristics of shopping centers in the United States, where a large number of properties are not in inner-city areas but outside metropolitan areas. Nonetheless, Figure 73 demonstrates that there is a trend toward metropolitan areas because the relative percentage of "USA (Others)" decreased during the last decade from 47% to 40%. Furthermore, it is shown that REITs have increased their holdings in the South East area from 7% to around 12% while the other sectors represent relatively constant holding over the study period (1995-2006).

Figure 73: Pro-rata Retail Area Held by Retail REITs in NCREIF Regions



Source: SNL REAL ESTATE, PFEFFER.

Referring to the descriptive statistics of the Retail REIT sample, Table 25 specifies the characteristics of the properties. As shown, the number of properties has more than tripled during the period 1995 to 2006. Moreover, the average size fluctuated between 190 and 220 thousand square feet except for the period 1996 to 1997, which is confirmed by the median million square feet owned. The standard deviation in size remained more or less constant between 250,000 and 300,000 square feet except for 1997.

Table 25: Descriptive Statistics Retail Properties in Sample

Square Feet	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Buildings (#)	1,846	2,780	3,431	4,005	4,650	4,606	4,728	4,883	4,929	5,088	5,258	5,048
Total Area (Mio)	421.5	579.7	712.1	867.1	980.8	956.4	974.9	1,041.3	1,095.0	1,179.1	1,145.9	1,132.4
Average (´000)	228	209	208	217	211	208	206	213	222	232	218	224
Std. Dev. (´000)	279	297	298	308	338	310	300	308	317	324	310	318
Median (´000)	1,800	1,761	1,700	1,761	766	766	766	766	766	766	766	766
Median (´000)	134	110	108	111	106	102	107	108	112	116	109	108
Max (´000)	2,291	2,296	2,267	2,179	9,422	2,776	2,779	2,779	2,851	2,620	2,610	2,611

Source: SNL REAL ESTATE, PFEFFER.

Since most malls are not located in downtown areas, the market category "USA (Others)" dominates the sample, accounting for 42% of the retail area. Consequently, the accumulated figures for the Top Five, 10, and 15 markets are accordingly high. It is important to recognize that the share of the market "USA (Others)" decreases in importance when the asset holding of sectors and individual REITs are combined with

the market cycle indicators such as rent levels because rent levels are significantly higher in the other 48 markets. For example, the average rent level for retail properties in New York is more than 50% higher than for "USA (Others)," reducing the "economic importance" of this market to about 30% in weight ($29.17 per square feet per year compared to $18.81 per square feet per year in 2006:Q1).[276]

Table 26: Top 10 Metro Areas by Retail Area Owned – LT Average 1995-2006

No	Metro	Weight	Accumulated
1	USA (others)	41.7%	**Top 5:**
2	New York-Northern New Jersey-Long Island, NY-NJ-PA	3.7%	**55%**
3	Chicago-Naperville-Joliet, IL-IN-WI (Metro)	3.3%	**Top 10:**
4	Atlanta-Sandy Springs-Marietta, GA (Metro)	3.2%	**69%**
5	Washington-Arlington-Alexandria, DC-VA-MD-WV (Metro)	3.1%	**Top 15:**
6	Los Angeles-Long Beach-Santa Ana, CA (Metro)	3.0%	**76%**
7	Houston-Sugar Land-Baytown, TX (Metro)	2.8%	
8	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD (Metro)	2.8%	
9	Miami-Fort Lauderdale-Pompano Beach, FL (Metro)	2.7%	
10	Dallas-Fort Worth-Arlington, TX (Metro)	2.5%	

Source: SNL REAL ESTATE, PFEFFER.

These findings are reflected in the degree of regional and market concentration. Due to the large share of the market previously described, the degree of concentration is the highest of all five sectors that are the subjects of this analysis. Nonetheless, the degree of regional concentration decreased continuously during the decade analyzed, by MSA as well as by NCREIF region. This demonstrates the necessity of a market-specific analysis on a REIT-sector level. Due to the different regional focus of individual REITs, e.g., the North East for Boston Properties (BXP), a separate analysis of individual markets and the respective exposure of a REIT is nearly always essential.[277]

Table 27: Degree of Concentration by MSA and NCREIF Region – Retail

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
By NCREIF	0.26	0.23	0.23	0.21	0.21	0.22	0.22	0.21	0.20	0.21	0.21	0.21
By MSA	0.23	0.20	0.19	0.17	0.17	0.18	0.18	0.17	0.17	0.17	0.18	0.18

Source: SNL REAL ESTATE, PFEFFER.

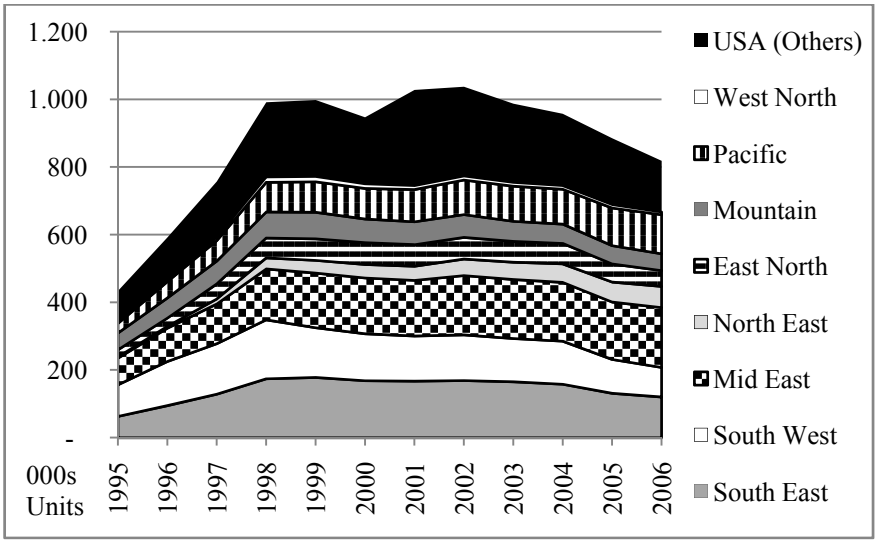
[276] Cf. PPR (2007a), no page.

[277] A separate analysis would not be necessary if the regional exposure of a REIT equals the national average which would make an analysis of the exact market exposure obsolete.

4.4.1.4 Apartment Real Estate Investment Trusts Sector

As shown in Figure 74, REITs are some of the largest owners of apartment properties in the U.S. with a maximum of one million units in 1998. Since then, the real estate portfolio of Apartment REITs decreased to a level of about 800,000 units at the end of 2006. The reasons for the shrinkage of the portfolio are mainly Apartment REITs going private, for example, the acquisition of Carr America by Blackstone with a deal volume of $5.6 billion.[278] In comparison to the other REIT sectors, Figure 74 shows that AP-REITs have a relatively larger exposure in the South East NCREIF region, because AP-REITs have a strong exposure in Florida, namely in Miami, Orlando, or Tampa. On average, the South East represents nearly 20% of all apartment units owned over the sample period.

Figure 74: Number of Apartment Units Held by Apartment REITs



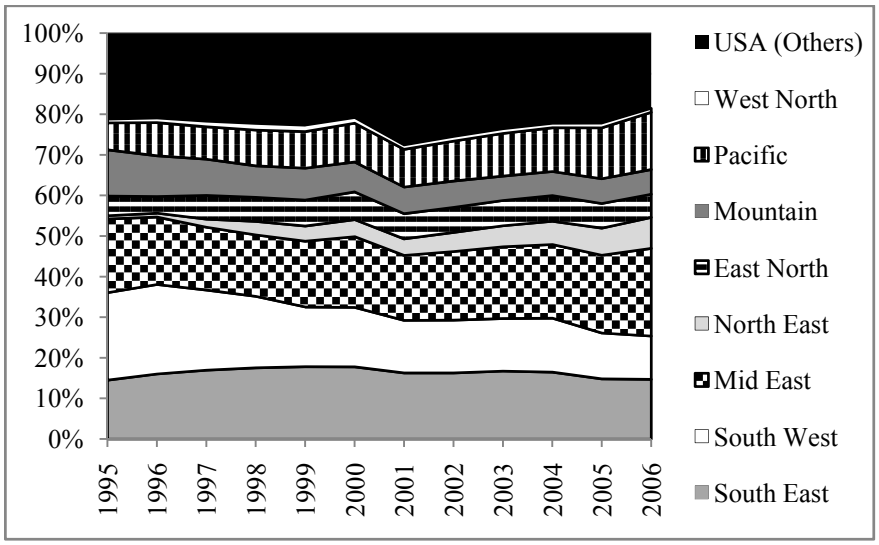
Source: SNL REAL ESTATE, PFEFFER.

Based on the pro-rata share held in the different NCREIF regions, AP-REITs have divested some regions such as the South West (21% to 11%) and "USA Others" (21% to 16%). On the other side, REITs significantly increased their holdings in the Pacific region (9% to 19%) and in the North East (1% to 8%). The growth of the asset base in California (LA +32%, San Francisco +20%, San Jose +24%) contributed to the relative increase in the Pacific region in the total sample. Although the North East and East North are relatively small NCREIF regions by market size for apartment properties,

[278] Cf. CITIGROUP (2006), no page.

REITs expanded significantly in the North East and East North (e.g., Portland +60%) during the study period.

Figure 75: Pro-rata Share Held by AP-REITs in NCREIF Regions



Source: SNL REAL ESTATE, PFEFFER.

In analyzing the descriptive statistics, AP-REITs impressively grew their asset base from around 1,500 properties in 1995 to about 3,500 in 2004. This equals an average increase of 109 properties per year (or 131 per year until 2004), which equals about 29,000 apartment units per year (or 34,700, excluding 2005 to 2006). The largest apartment complex by far is owned by Equity Residential located in Seattle and was bought in 2002. Although there are a few very large and very small apartment buildings in the sample, the average number of units ranges from around 240 to 285.

Table 28: Descriptive Statistics Apartment Properties in Sample

Apartments	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Buildings (#)	1,501	2,035	2,946	4,096	4,039	3,492	3,445	3,571	3,426	3,405	3,204	2,816
Units (000s)	434	592	758	992	999	947	937	964	925	913	850	807
Average	289	291	257	242	247	271	272	270	270	268	265	287
Std. Dev.	157	157	170	183	192	195	195	202	209	208	211	256
Median	256	260	236	220	220	240	240	240	238	238	230	250
Maximum	1,350	1,350	2,113	2,899	2,907	2,907	2,907	3,652	3,757	3,801	3,693	8,334

Source: SNL REAL ESTATE, PFEFFER.

After analyzing the Top 10 markets in the sample, "USA (Others)" has the largest portion, with 19%. It is important to note that the portion of the market "USA (Others)" decreases significantly when the exposure in each MSA is multiplied with the market cycle date. This means that the economic importance of "USA (Others)" is lower

because the rents in the 48 metro areas are higher than in the category "USA (Others)" that represents all other local marketws.

Also, the figures show the average over 12 years. This implies that the market exposure may have changed over time, for example, from 9.2% in 1995 to 5.4% in 2006. Table 29 demonstrates that AP-REITs have the second-largest average market exposure in Dallas, Atlanta, and Washington, DC, with more than 5%. The accumulated percentages show that the AP-sample is less concentrated than the three sectors analyzed before. Nonetheless, the Top Five markets still account for close to 45% of the market and the Top 15 markets for more than 70%.

Table 29: Top 10 Metro Areas by Units Owned – Long-term Average 1995-2006

No	Metro	Weight	Accumulated
1	USA (others)	18.6%	**Top 5:**
2	Dallas-Fort Worth-Arlington, TX (Metro)	7.0%	**43%**
3	Atlanta-Sandy Springs-Marietta, GA (Metro)	6.5%	**Top 10:**
4	Washington-Arlington-Alexandria, DC-VA-MD-WV (Metro)	6.5%	**61%**
5	Houston-Sugar Land-Baytown, TX (Metro)	4.9%	**Top 15:**
6	Los Angeles-Long Beach-Santa Ana, CA (Metro)	4.6%	**71%**
7	Phoenix-Mesa-Scottsdale, AZ (Metro)	4.1%	
8	Miami-Fort Lauderdale-Pompano Beach, FL (Metro)	3.0%	
9	Tampa-St. Petersburg-Clearwater, FL (Metro)	2.8%	
10	Seattle-Tacoma-Bellevue, WA (Metro)	2.8%	

Source: SNL REAL ESTATE, PFEFFER.

Continuing with the degree of concentration, the Hirschman-Herfindahl index proves that the AP-REITs sample does not have a high degree of focus. Precisely, most of the 49 markets tend to have a share of between 7% and 3%. Moreover, the degree of concentration has not changed drastically over time. Measured by NCREIF regions, it is already relatively low at 0.17/0.15. It is even lower for the MSA classification, ranging between two-thirds and one half of the degree of concentration compared to the NCREIF regions.

Table 30: Degree of Concentration by MSA and NCREIF Region – Apartment

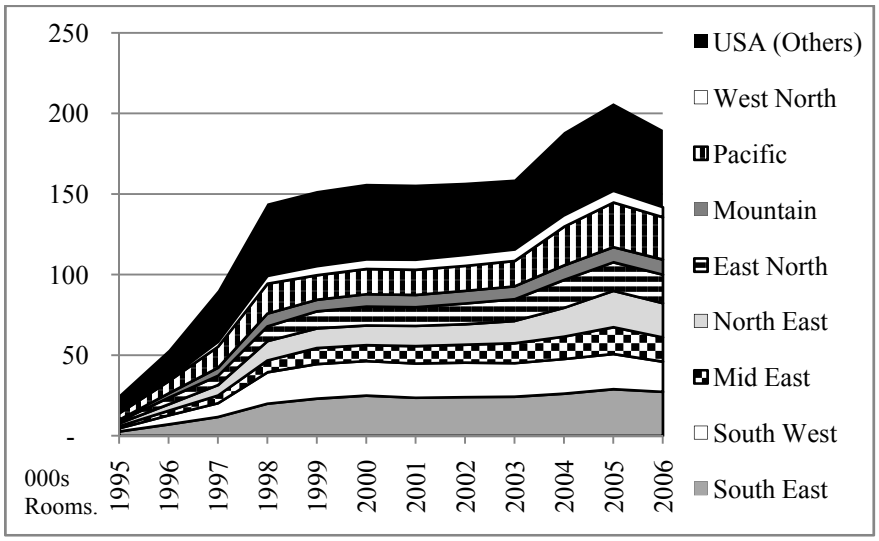
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
By NCREIF	0.17	0.16	0.16	0.15	0.15	0.15	0.16	0.16	0.15	0.15	0.15	0.15
By MSA	0.09	0.08	0.08	0.08	0.08	0.07	0.10	0.09	0.09	0.08	0.08	0.07

Source: SNL REAL ESTATE, PFEFFER.

4.4.1.5 Hotel Real Estate Investment Trusts Sector

The size of the HO-REITs sample illustrates the development of listed hotel real estate. As shown in Figure 76, the number of hotel rooms increased drastically between 1995 and 1998 from about 25,000 to roughly 200,000 in 1998. The HO-REIT sector grew significantly internally and externally during this period, which is underscored by a number of IPOs between 1994 and 1998, for example, Equity Inns Inc., Winston Hotels Inc., Felcor Lodging Trust Incorp orated, Innkeepers USA Trust, LaSalle Hotel Properties, and others as summarized in Table 73.[279]

Figure 76: Total Number of Hotel Rooms Held by Hotel REITs



Source: SNL REAL ESTATE, PFEFFER.

Subsequently, the number of hotel properties in the sample remained relatively constant until 2003/04 when various companies selected REIT status, e.g., Strategic Hotel & Resorts or Sunstone Hotel Investors. Afterwards, the sample size decreased due to REITs going private (MeriStar Hospitality and La Quinta).[280] Altogether, the HO-REIT sample has grown, with an average annual percentage of 13% per year if one looks at the 12-year period.

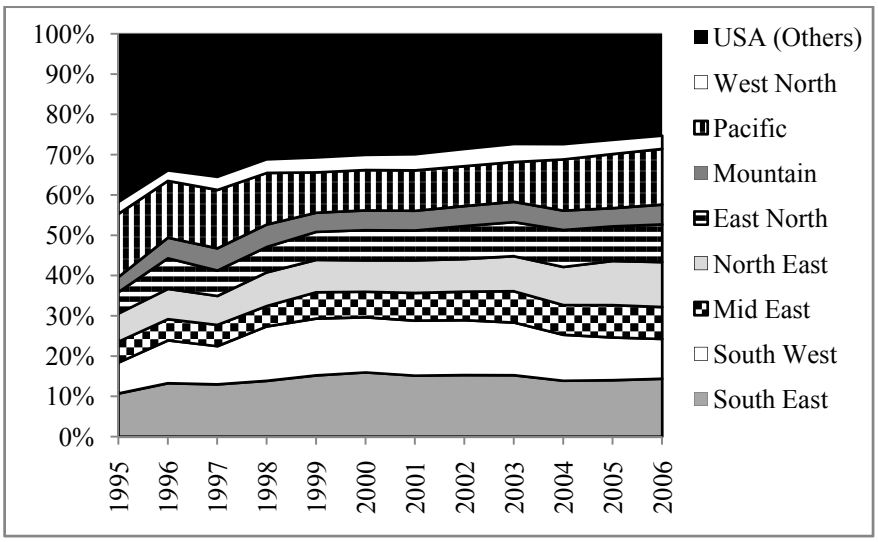
Analyzing the pro-rate allocation, REITs have increased their holdings in the individual metro areas covered in the sample that are aggregated by NCREIF regions. More specifically, the share of "USA (Others)" decreased from around 35% in 1995 to 20% in 2006. This illustrates that REITs have increased their holdings in large metro areas in

[279] Cf. Table 73, p. 301.

[280] The Hotel and Office REIT Sector experienced the most going privates.

comparison to "B" (smaller metro areas) and "C" (micro areas) markets that are summarized in the category "USA (Others)." Moreover, growth mostly took place in the Pacific, the North East (e.g., New York times 25, with 15,000 rooms in 2006) and the South East Region, for example, times 12 in San Francisco (>9,000 rooms in 2006) and with the same multiple in Tampa, Florida (3,500 rooms in 2006) or times 15 in Orlando (>7,300 rooms in 2006).

Figure 77: Pro-rata Share Held by Hotel REITs in NCREIF Regions



Source: SNL REAL ESTATE, PFEFFER.

Furthermore, the descriptive statistics for the hotel properties sample show that REITs increased sixfold in size (measured by the number of properties) during the study period. The smallest hotel in the sample had 23 rooms (1995) or 35, respectively, for 2006. The largest hotel, owned by Host Hotels and Resorts in Orlando, has more tha 1,000 rooms.

Table 31: Descriptive Statistics Hotel Properties in Sample

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Buildings	181	343	545	763	863	888	886	885	907	1,028	1,107	1,047
Rooms	25,288	53,369	90,320	144,173	151,921	156,452	155,907	157,138	159,103	188,499	206,362	189,902
Average Size	140	156	166	189	176	176	176	178	175	183	186	181
Std. Dev.	58	74	90	106	106	113	111	110	108	119	130	134
Minimum	23	23	23	23	23	23	23	23	23	23	23	35
Median	129	135	137	155	136	135	136	137	135	141	137	134
Maximum	409	545	742	742	742	1,176	1,192	1,192	1,192	1,192	1,192	1,195

Source: SNL REAL ESTATE, PFEFFER.

Moreover, the statistics in Table 31 prove that there is a clear trend toward larger hotels as demonstrated by the average and median number of rooms. Precisely, the average size of a REIT-owned hotel property is 50% larger in 2006 than it was in 1995. This means that REITs have continuously acquired or developed larger hotels (and sold smaller hotels in their sample). Consequently, the standard deviation also increased, illustrating that hotel properties owned by REITs are less uniform regarding size than they were in 1995.

Looking at the Top 10 markets reveals a similar picture regarding the weight in the sample. In contrast to the MR-REIT sample, "traditional" business/holiday destinations such as New York, LA, and San Francisco or typical holiday destinations such as Orlando and the Miami area and Florida are more important for HO-REITs. While the share of some markets such as the Atlanta MSA has remained relatively constant, other MSAs, such as Dallas, have decreased (from 6.7% in 1995 to 3.2% in 2006) or increased, such as New York (from 2.0% in 1995 to 5.8% in 2006).

Table 32: Top 10 Metro Areas by Hotel Rooms owned, LT-Average 1995-2006

No	Metro	Weight	Accumulated
1	USA (others)	24.2%	**Top 5:**
2	Atlanta-Sandy Springs-Marietta, GA (Metro)	5.5%	**43%**
3	Dallas-Fort Worth-Arlington, TX (Metro)	5.3%	**Top 10:**
4	New York-Northern New Jersey-Long Island (Metro)	4.1%	**61%**
5	Washington-Arlington-Alexandria, DC-VA-MD-WV (Metro)	3.9%	**Top 15:**
6	Los Angeles-Long Beach-Santa Ana, CA (Metro)	3.9%	**72%**
7	Chicago-Naperville-Joliet, IL-IN-WI (Metro)	3.9%	
8	San Francisco-Oakland-Fremont, CA (Metro)	3.7%	
9	Orlando-Kissimmee, FL (Metro)	3.1%	
10	Miami-Fort Lauderdale-Pompano Beach, FL (Metro)	2.9%	

Source: SNL REAL ESTATE, PFEFFER.

Generally speaking, the degree of concentration in the HO-REIT sample is very low. Interestingly, the degree of concentration by NCREIF regions increased – although only slightly, by 0.04[281] – and decreased by 0.09 for MSAs. Although the share of the largest region "USA (Others)" decreased from 36% to 18%, other large regions such as the South East (11% to 16%) or the Pacific region (10% to 17%) increased, which caused the increase in the degree of concentration. These results are more level across MSA,

[281] The Index ranges from 0 to 1; 1 indicating that all assets are in one NCREIF region and vice versa.

where the decrease in the largest region was more or less equally distributed across the remaining markets, which caused a decrease in the degree of regional focus.

Table 33: Degree of Concentration by MSA and NCREIF Region – Hotel

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
By NCREIF	0.23	0.18	0.19	0.17	0.17	0.16	0.16	0.16	0.15	0.15	0.15	0.14
By MSA	0.19	0.13	0.14	0.11	0.11	0.11	0.11	0.10	0.09	0.09	0.09	0.09

Source: SNL REAL ESTATE, PFEFFER.

4.4.2 Real Estate Investment Strategies – Industry Examples

The illustration of the property holdings of individual REITs is important to illustrate the need for a company-specific analysis. In this way, the following sections give three examples in terms of companies, preferably with different investment strategies, per sector. Also, the different allocations by means of metro areas show why REITs within a sample can have completely different market cycles. In addition, there are different types of REITs regarding metro area exposure. Different in this context refers to the number of MSAs invested in and the corresponding degree of specialization by the NCREIF and metro area.[282] The degree of specialization depends on the investment strategies determined by the management during the study period that are reflected in the property holdings and their corresponding changes over time.

4.4.2.1 Real Estate Investment Strategies of Office Real Estate Investment Trust Companies

Looking at the three industry examples, Crescent Real Estate Equities Company (Crescent), Highwoods Properties, Inc. (Highwoods), and Mack-Cali Realty Corporation (Mack-Cali), from the Office REIT sector first, the analysis preferably refers to companies that had their IPOs before 1995 in the context of the company-level analysis. In this light, the reason, therefore, is the simple fact that REITs that were active over the whole 12-year period reflect the dynamics over the whole period of investigation. As shown in Table 34: Office REIT Industry Examples – Companies 1 to 3, all three REITs had their IPOs in 1994.

[282] Refer to Chapter 3.5.2, p. 93.

Table 34: Office REIT Industry Examples – Companies 1 to 3

Company Name	Sector	IPO
Crescent Real Estate Equities Company	Office	4/28/1994
Highwoods Properties, Inc.	Office	6/7/1994
Mack-Cali Realty Corporation	Office	8/25/1994

Source: SNL REAL ESTATE, PFEFFER.

Nonetheless, the overview of the degree of concentration by first, the NCREIF region and second by metro area demonstrates that the three companies have developed differently over the period of investigation.[283] While Highwoods and Crescent had approx. the same degree of concentration by NCREIF region in 1995, Highwoods has become significantly more diversified by region. In contrast, Crescent has become more focused by region. Interestingly, Crescent had become more specialized by region until 2000 but changed its strategy from then onwards. Mack-Cali Realty had been extremely diversified in 1995 and also in 2006 with an extremely high degree of concentration close to 1 in 2006. Nonetheless, Mack-Cali Realty has taken the opposite strategy to Crescent by becoming more diversified until 2001 and then refocusing on a limited number afterwards. These three industry examples illustrate the diversity in terms of investment strategies within the Office REIT sector.

Table 35: Degree of Concentration – Office REITs Industry Examples

NCREIF	95	96	97	98	99	00	01	02	03	04	05	06
Crescent	0.55	0.67	0.69	0.67	0.68	0.71	0.70	0.70	0.69	0.63	0.61	0.58
Highwoods	0.51	0.34	0.37	0.38	0.36	0.36	0.35	0.35	0.35	0.35	0.36	0.36
Mack-Cali	0.81	0.61	0.60	0.53	0.49	0.54	0.58	0.66	0.69	0.73	0.76	0.84
Markets	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**
Crescent	0.40	0.28	0.28	0.27	0.27	0.31	0.30	0.31	0.30	0.28	0.27	0.25
Highwoods	0.38	0.17	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.14	0.15
Mack-Cali	0.81	0.52	0.47	0.38	0.35	0.39	0.42	0.46	0.47	0.52	0.54	0.59

Source: SNL REAL ESTATE, PFEFFER.

Comparing the degree of specialization by NCREIF region with the degree of specialization by metro area, the Crescent example shows that these two indicators do not necessarily move in the same direction. Although Crescent had become more specialized by NCREIF region, it had become more diversified by metropolitan statistical area and stayed at a relatively low level (0.25-0.30) for the rest of the study

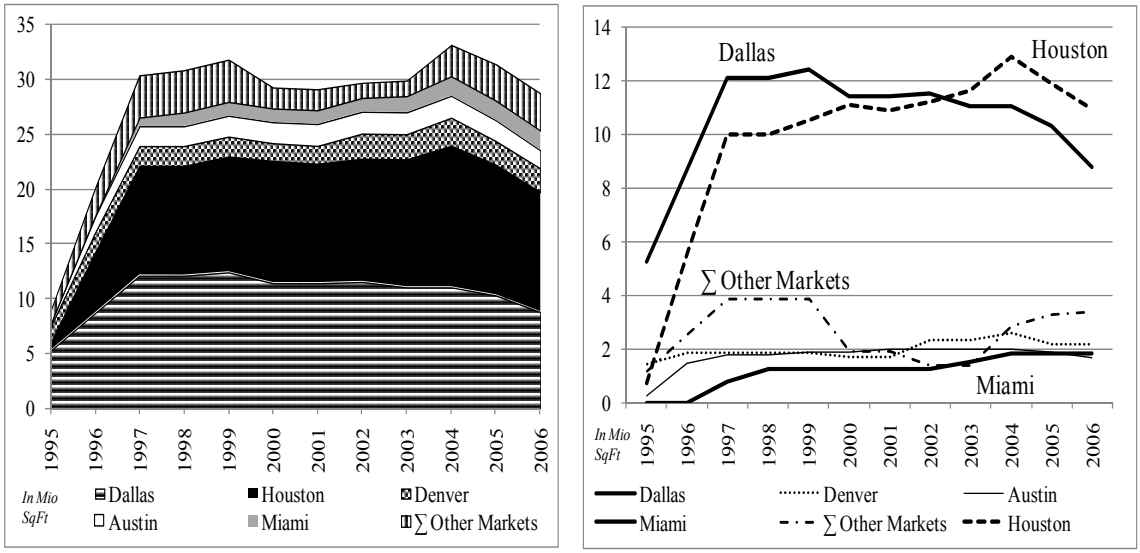
[283] Refer to Chapter 3.3.1, p, 78 for an explanation of data and definition of metro areas.

period. Apparently, the degree of concentration by MSA cannot be higher than by NCREIF region.

In contrast to Crescent, Highwoods' degree of concentration by MSA is in line with the REIT's degree of concentration by NCREIF region. Consequently, it can be concluded that Highwoods has most likely expanded in other regions/MSAs than it had invested in before. Mack-Cali Realty represents a third type of diversification strategy, because this REIT had become more diversified by MSA over the whole period while diversifying on a regional level until 1999 and then specializing on fewer regions afterwards. This means that it has diversified more and more within a region over the period 1995 to 2006 and slightly changing its strategy in terms of regions in 1999/2000. The following sections illustrate and specify how these companies have invested in and divested from certain regions and metro areas.

Picturing the investment strategy of the individual companies by metro areas (not NCREIF regions), Figure 78 illustrates the "Top Five" (the five largest markets a REIT is invested in) plus the "∑ Other Markets." The sum of all other markets aggregates all other markets in one market only for reasons of clarity, not for the calculation of the degree of specialization. While the left side shows the total portfolio of the REIT *accumulating* the six groups, the right side illustrates the *absolute size of the individual markets* over time.

Figure 78: Total and Individual Market Exposure – Crescent



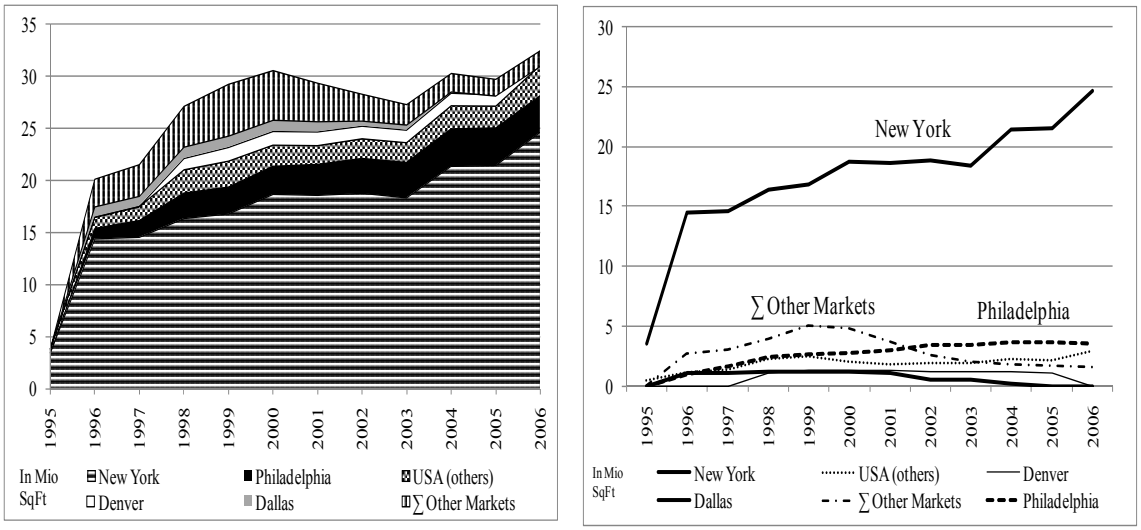
The diagram pictures the Top Five (largest by area) and "∑ All Other Markets" only.

Source: SNL REAL ESTATE, PFEFFER.

For example, the total portfolio size in millions of square feet of the Crescents portfolio was 30 in 1997, whereby Dallas contributed with 12 million square feet, Houston with 10 million square feet, and so on. The sum of all other markets Crescent is invested in adds up to approx. four million square feet in 1997. Consequently, most of Crescent REIT's properties are in the Dallas or Houston metro area.

Looking at the development of the portfolio over time, the left diagram illustrates the growth of Crescent from 1995 to 1997 with more than tripling the portfolio size. Thus, the right side demonstrates that this growth took place in only two markets by the most part, namely Dallas and Houston. Afterwards, Crescent did not grow its portfolio after 1997. Nonetheless, it is shown on the right side that Crescent started to divest from the Dallas market after 1999 and increased its market share in Houston. Altogether, Crescent is a "Texas Specialist" REIT with only small exposures in other areas such as Denver, Colorado, or Miami, Florida. This makes Crescent's space markets development dependent on the development of the overall economy in Texas, similar to the energy sector.

Figure 79: Total and Individual Market Exposure – Mack-Cali Realty



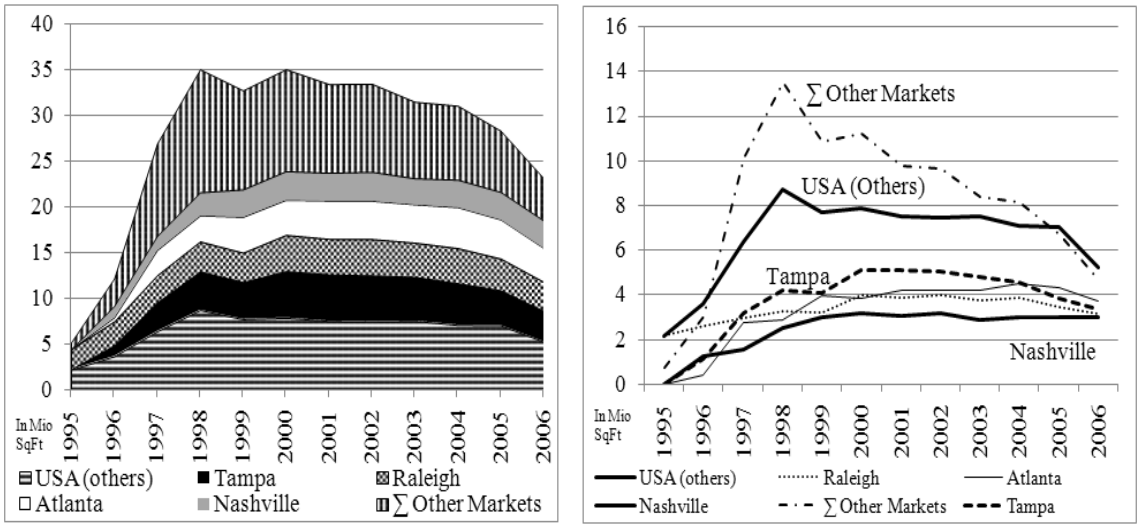
Source: SNL REAL ESTATE, PFEFFER.

Analyzing the portfolio of the Mack-Cali Realty Corporation (Mack-Cali), this particular REIT is even more specialized not only within an NCREIF region but also within a state (New York). The left side of Figure 78 shows the growth of the portfolio, which is similar to Crescent's. Hereby, the portfolio is dominated by property holdings in the New York area, which make Mack-Cali Realty a "New York Specialist."

Consequently, Mack-Cali Realty as an Office REIT depends heavily on job growth in the New York area that triggers the demand for additional space. Accordingly, job growth in the New York area depends on the development of the banking, insurance, and financial institutions industry.

Although Mack-Cali Realty slightly increased its property holdings in Philadelphia, as demonstrated on the right side of the diagram, these markets all remain under five million square feet. Even the sum of all other markets decreased after the year showing that management has followed a specialized "New York Strategy" even after the 9/11 attacks and following the downturn in the office markets in New York. In addition, it is illustrated that the five largest metro areas a REIT is invested in seem to cover the majority of the portfolio.

Figure 80: Total and Individual Market Exposure – Highwoods



Source: SNL REAL ESTATE, PFEFFER.

Although the Highwoods Realty Corporation, Inc. (Highwoods) has followed the other two Office REITs in terms of growth during the period 1995 to 1998, Highwoods' portfolio size decreased significantly from then on from a maximum of 35 million square feet in 1998 to under 25 million square feet in 2006, as shown on the left side of the diagram. Also, Highwoods is a more diversified REIT in terms of allocation of its property allocations by metro area and NCREIF region.

In addition, the size of the market category "USA (Others)" that covers all the MSAs that are not part of one of the 48 large MSAs as specified in chapter 3 is relatively high. This means that Highwoods manages properties in a broad range of MSAs that are not

in one of the large MSAs but also smaller "B" and "C" markets. This fact is underpinned by the first largest "markets" as shown on the right side are not individual MSAs such as Tampa being the largest individual MSA in the portfolio. Consequently, Highwoods is not only a different type of REIT in terms of diversification but is also subject to different market cycles, as presented in 2.1.1.

4.4.2.2 Real Estate Investment Strategies of Industrial Real Estate Investment Trust Companies

The three industry examples from the Industrial sector are EastGroup Properties, Inc., First Industrial Realty Trust, Inc., and Liberty Property Trust. EastGroup Properties, Inc. focuses on the "sunbelt" markets and focuses on distribution facilities near major transport centers in the 5,000- to 50,000-square-foot range.[284] In contrast, First Industrial Realty Trust is a provider of diversified industrial properties. Diversified means that the company owns and manages Research & Development, flex, manufacturing, light industrial, regional warehouse, bulk warehouse, and complete supply-chain solutions for corporate customers.[285] Liberty Property Trust owns industrial, mainly flex and distribution facilities, and office buildings.[286]

Table 36: Industrial REIT Industry Examples – Companies 1 to 3

Company Name	Sector	IPO
EastGroup Properties, Inc.	Industrial	12/30/1971
First Industrial Realty Trust, Inc.	Industrial	6/23/1994
Liberty Property Trust	Industrial	6/16/1994

Source: SNL, PFEFFER.

In contrast to the Office REIT industry examples, the Industrial REIT industry examples all became more diversified by MSA and by NCREIF region. This also reflects most of the other Industrial REITs in the sample. This may be because this REIT property subtype needs to be represented in more and more markets to serve its customer base, which has become more diversified nationally and internationally. This is in line with the research by MUELLER/MUELLER (2007); MUELLER/LAPOSA (1994a), who found that

[284] Cf. EGP (2008), no page.

[285] Cf. FR (2008), no page.

[286] Cf. LRY (2008), no page.

the Path of Goods Movement is important for the success of industrial real estate and REITs accordingly.[287] Furthermore, the only two REITs that had significant foreign property holdings in the sample were ProLogis and the AMB Properties Corporation. Nonetheless, there are differences in terms of the degree of specialization. For example, EastGroup Properties, Inc. is the most specialized REIT in terms of NCREIF region of the three companies but the least specialized by markets.

As a consequence, EastGroup Properties, Inc. is an Industrial REIT that invests in a small number of regions but multiple MSAs within these regions. In sum, the Industrial REIT sample seems to be more specialized than the Office REIT sample, which appears to be logically taking into consideration the dynamics of the underlying property types. In this way, EastGroup Properties, Inc. is a "Texan Specialist" represented in all major markets of this state.

Table 37: Degree of Concentration – Industrial REITs Industry Examples

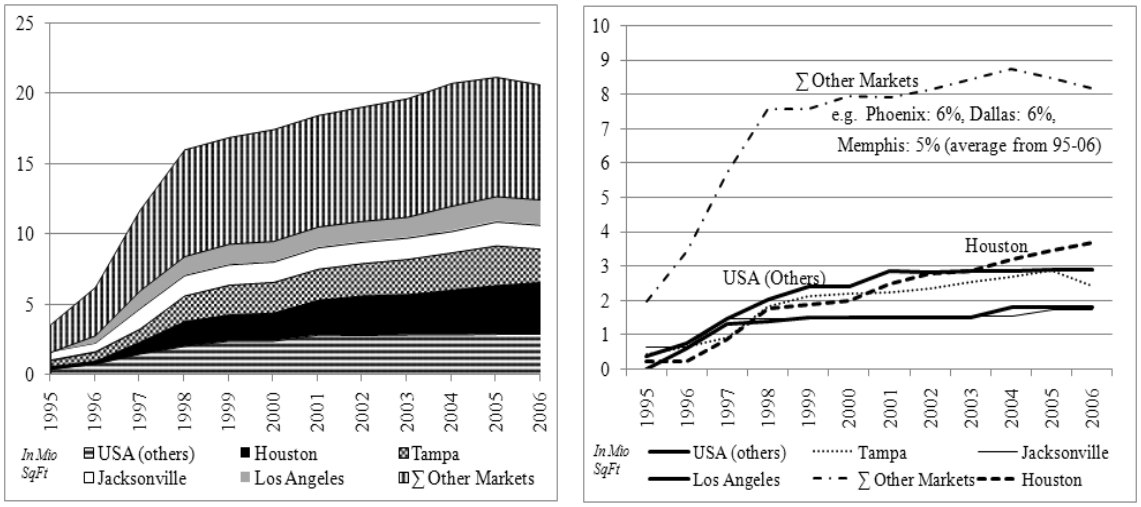
NCREIF	95	96	97	98	99	00	01	02	03	04	05	06
Eastgroup	0.41	0.27	0.25	0.26	0.25	0.25	0.24	0.25	0.25	0.25	0.25	0.23
First Ind.	0.27	0.29	0.19	0.18	0.17	0.18	0.17	0.16	0.16	0.16	0.16	0.16
Liberty	0.28	0.28	0.23	0.20	0.20	0.20	0.20	0.19	0.19	0.20	0.21	0.22
Markets	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**
Eastgroup	0.11	0.11	0.11	0.11	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08
First Ind.	0.19	0.13	0.09	0.08	0.08	0.08	0.07	0.06	0.06	0.06	0.06	0.06
Liberty	0.25	0.26	0.20	0.17	0.18	0.18	0.17	0.17	0.17	0.17	0.18	0.18

Source: SNL REAL ESTATE, PFEFFER.

Looking at the overall development of the EastGroup Properties portfolio, Figure 81 shows the two different growth phases from 1995 to 1998 with more than tripling of the portfolio size, moderate growth from 1998 to 2005, and a decrease from 2005 to 2006. As expressed by the degrees of concentration, EastGroup Properties, Inc. is extremely diversified by market. The largest individual MSA in the portfolio is Houston, with nearly 4 million square feet in 2006 or 10% on average over the 12-year period. Furthermore, the diagram suggests that the company has expanded in all of its relevant markets more or less at the same pace. In terms of "∑ Other Markets", EstGroup Properties, Inc. largest other markets are in Texas with a share of around 5/6%.

[287] Cf. MUELLER, G.R./MUELLER, A.G. (2007); MUELLER, G.R./LAPOSA, S.P. (1994a), page 42.

Figure 81: Total and Individual Market Exposure – EastGroup Properties, Inc.



Source: SNL REAL ESTATE, PFEFFER.

Also, the left side of the diagram shows that the five largest markets represent approx. half of the portfolio's size. The rest of the properties are spread over other MSAs from the South West to Florida (Tampa). The right side of the diagram confirms that most of the MSA EastGroup is invested in approx. between 5% and 10% of the total portfolio. In sum, EastGroup is a "South East/South West Region specialist" invested in multiple markets within these regions.

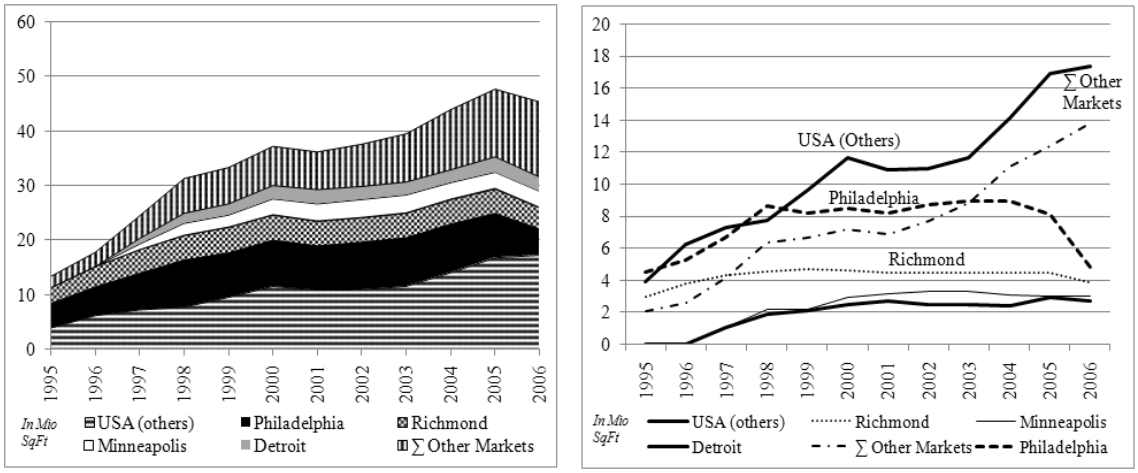
Comparing EastGroup with the Liberty Industrial REIT, the development in terms of the portfolio size is similar. Nonetheless, the regional focus of the portfolio is completely different. Liberty's properties are more clustered in the North-East and Mid-Eastern NCREIF regions compared to EastGroup. In addition, the number of properties that are not in one of the 48 MSAs is significantly higher (23% compared to 11% on average).

This means that EastGroup has higher exposure in large MSAs because the company targets distribution facilities close to major transportation centers and hubs,[288] while Liberty targets smaller MSAs and locations for its properties. An important market in the North East for Liberty is, in particular, Philadelphia. However, the company started to divest heavily here after 2004 (from 34% in 1995 to only 11% in 2006), although this is the company's headquarters.[289]

[288] Cf. EGP (2008), no page.

[289] Cf. LRY (2008), no page.

Figure 82: Total and Individual Market Exposure – Liberty

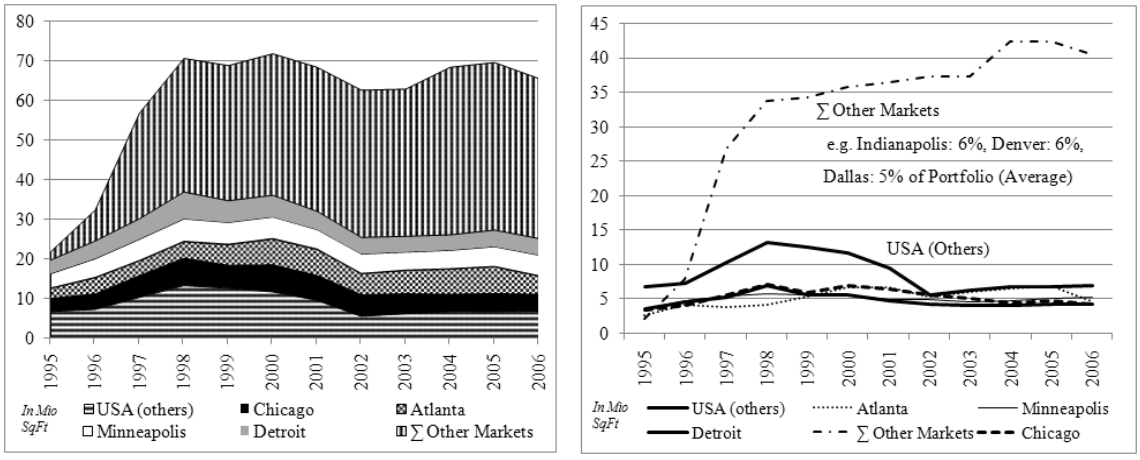


Source: SNL REAL ESTATE, PFEFFER.

Similarly, the company changed its exposure in the Mid-East region from 28% in 1995 to 13% in 2006. The company did so not by selling properties in these regions but by a slower growth rate compared to the other markets. For example, the property holdings in Richmond (Mid-East region) have increased from approx. three million square feet to approx. 3.9 million (plus 30%) while the company increased its exposure in Minneapolis (the West-North region) from 0 (1995) to three million square feet in 2006.

Similar to Liberty, First Industrial Realty Trust has undergone the same development. Nonetheless, First Industrial Realty Trust is more diversified. The three largest markets are "USA (Others)" with 13%, Chicago with 8%, and Atlanta with 8%. Compared to the other two Industrial REITs, First Industrial Realty Trust seems to focus more on air hubs and ports.

Figure 83: Total and Individual Market Exposure – First Industrial Realty Trust



Source: SNL REAL ESTATE, PFEFFER.

In addition to Chicago and Atlanta, the company has significant exposure in Detroit and around the Detroit airport as well as Denver (6%), Dallas (5%), and New York (5%) on average. For example, the company has grown from 0.2 million square feet in Dallas in 1995 to 2 million square feet in 1998 and 5.8 million in 2005. Furthermore, the sharp portfolio growth has mainly taken place in these, for First Industrial Realty Trust, "new" markets.

To conclude, Industrial REITs appear to be more diversified by market and region compared to Office REITs. Taking into consideration the nature of industrial real estate and the needs of its customers, which need storage/warehouse/logistic space at multiple locations, these findings seem to be logical.

4.4.2.3 Real Estate Investment Strategies of Retail Real Estate Investment Trust Companies

Comparing the investment strategies of Retail REITs, the investment strategies of these companies have to incorporate the property subsector. In total, the Retail REIT sample includes three different sectors: regional malls, shopping centers, and other retail real estate. Although these three categories may have different drivers that determine the demand for space, the analysis cannot differentiate between these three types due to the limited availability of space market data. While Taubman Centers, Inc. (Taubman) focuses on regional malls, National Retail Properties, Inc. (Nat. Retail) focuses on single tenant stores, and Saul Centers, Inc. manages shopping centers.[290]

Table 38: Retail REIT Industry Examples – Companies 1 to 3

Company Name	Sector	Subsector	IPO
Taubman Centers, Inc.	Regional Mall	Regional Mall	11/30/1992
National Retail Properties, Inc.	Retail: Other	Single Tenant	10/9/1984
Saul Centers, Inc.	Shopping Center	Shopping Center	8/19/1993

Source: SNL REAL ESTATE, PFEFFER.

The degree of concentration as pictured in Table 39 shows that all three companies have become more diversified over the study period. Taubman is the most diversified company, which is also caused by the fact that it is the largest company of the three by means of area owned, as shown in the following paragraphs. Also, the size of regional

[290] Refer to Chapter 2.3.3 for a detailed classification and description, p. 46.

malls is typically larger than neighborhood shopping centers or single-tenant stores. This also means that regional malls cover or serve a larger area. The low degree of concentration of Taubman between 0.18 and 0.21 (by NCREIF region) implies that Taubman is active in multiple regions. Similarly, the coefficient of 0.08 to 0.09 by MSA of Taubman indicates that the company is active in a large number of the 49 markets covered.

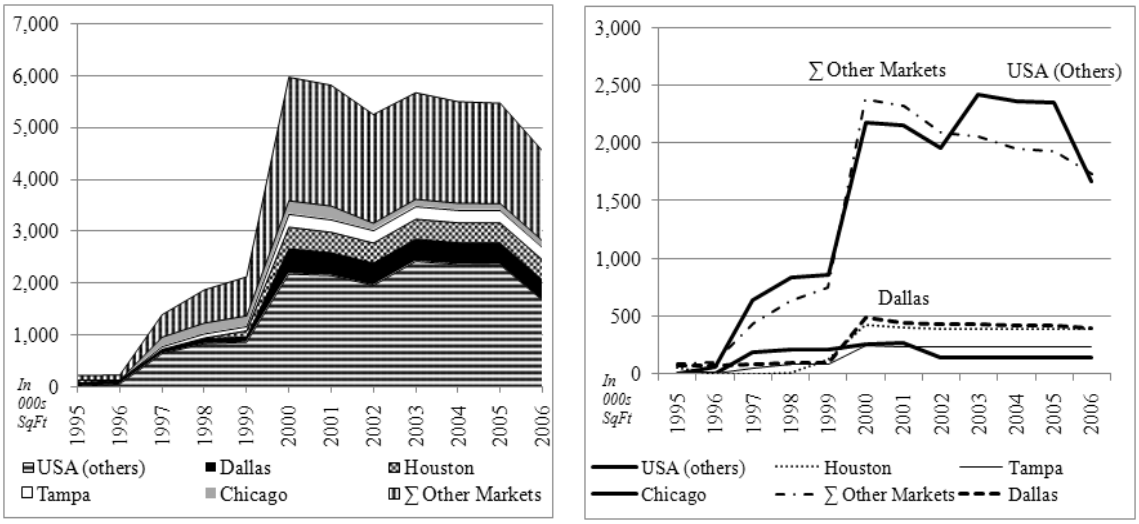
Table 39: Degree of Concentration – Retail REITs Industry Examples

NCREIF	95	96	97	98	99	00	01	02	03	04	05	06
Taubman	0.21	0.20	0.19	0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.18	0.18
Saul Cen.	0.55	0.53	0.53	0.53	0.51	0.50	0.50	0.51	0.46	0.42	0.40	0.38
Nat. Ret.	0.37	0.22	0.29	0.26	0.23	0.21	0.21	0.21	0.24	0.24	0.24	0.21
Markets	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**
Taubman	0.09	0.09	0.08	0.11	0.11	0.09	0.08	0.08	0.08	0.08	0.08	0.08
Saul Cen.	0.34	0.33	0.33	0.33	0.32	0.32	0.32	0.32	0.31	0.29	0.26	0.26
Nat. Ret.	0.20	0.21	0.25	0.22	0.19	0.16	0.16	0.16	0.20	0.20	0.21	0.16

Source: SNL REAL ESTATE, PFEFFER.

As shown in Figure 84 on the left side, National Retail has grown impressively from under one million square feet owned and managed in 1995 to six million square feet in 2000. The growth is not concentrated in a particular market but in secondary and tertiary MSAs and spread over a multitude of metro areas. This can be concluded from the high share of "USA (Others)" that covers smaller and mid-size MSAs and the composition or large share of the sum of other markets.

Figure 84: Total and Individual Market Exposure – National Retail

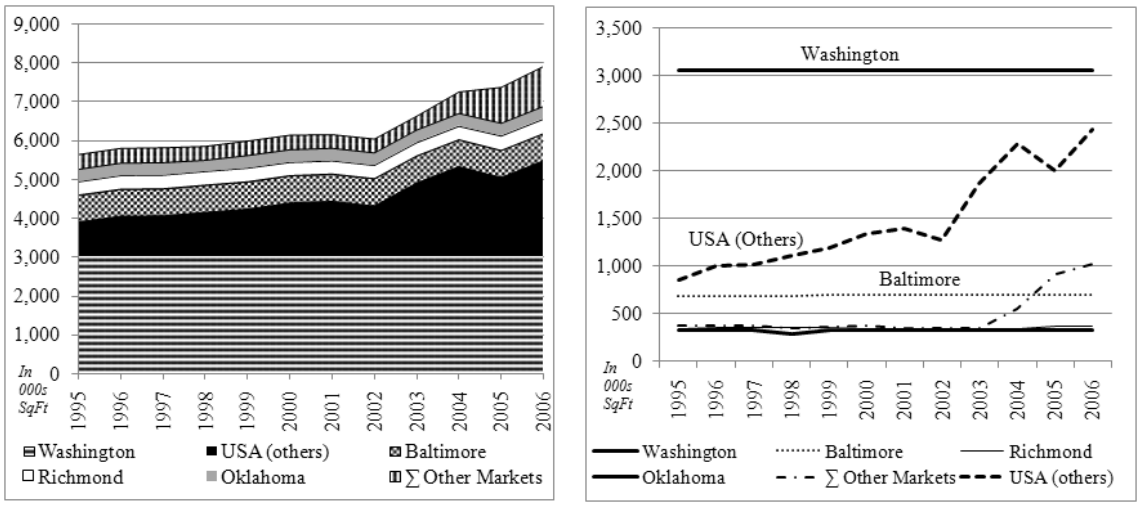


Source: SNL REAL ESTATE, PFEFFER.

As shown on the right side of the diagram, the largest individual MSA is Dallas. Single-store retail tenants are, for example, "Best Buy" or other large retailers. In addition, no individual MSA has a share larger than 250,000 square feet. Consequently, the large share of "USA (Others)" means that a large share of the properties are in "B" metro areas and micro areas. Also, the large share of "∑ Other Markets" illustrates that the company is quite diversified (908 properties in 44 states).[291]

In contrast, Saul Centers is a REIT that started from its base in the Washington, DC, area and has continued to grow out of this base to other markets surrounding Washington, DC. Interestingly, the share of the Washington, DC, property holdings has not changed at all. Saul Centers did not buy or sell properties in the Washington, DC, market but started to buy properties in small surrounding metro areas, in particular in Baltimore. Nonetheless, Saul Centers is a Mid-East region specialized REIT (Baltimore, Richmond, Washington, DC). In terms of property subtype, the company primarily focuses on strip/shopping centers anchored by big-box retailers and supermarkets.[292]

Figure 85: Total and Individual Market Exposure – Saul Centers



Source: SNL REAL ESTATE, PFEFFER.

Taubman is one of the larger and more diversified REITs. As shown on the left side of the diagram below, the company already owned a portfolio of 25 million square feet of retail space in 1995. In this way, the company has property holdings in every NCREIF region except for the West North. On average, the company has significant holdings in

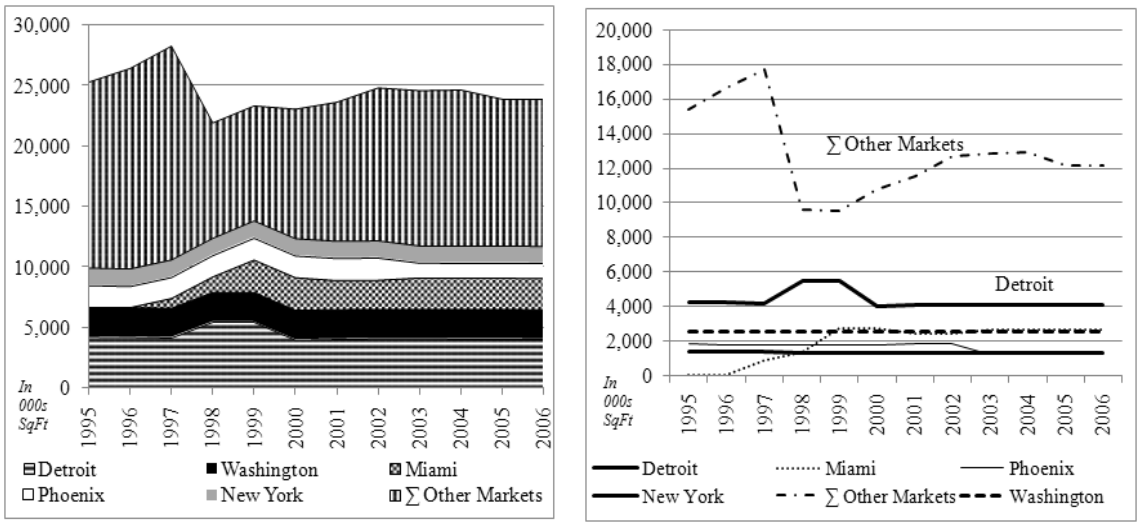
[291] Cf. NNNREIT (2008), no page.

[292] Cf. BFS (2008), no page.

the East-North (22%), South-East (15%), North-East (14%), Pacific (8%), and Mountain regions (11%) on average.

Consequently, investors that want to invest in listed retail real estate that is diversified on a national level could choose Taubman as an investment alternative. As pictured on the right side of the diagram, the largest individual MSA is Detroit, with an average share of 18% of the total portfolio. In summary, a clear diversification/specialization strategy cannot be identified for the Retail REIT sector besides the fact that portfolio growth and degree of specialization are negatively correlated, which appears to be logical.

Figure 86: Total and Individual Market Exposure – Taubman



Source: SNL REAL ESTATE, PFEFFER.

The research by MILLER/CLAURETIE/SPRINGER (2006); AMBROSE/HIGHFIELD/LINNEMAN (2005); ANDERSON et al. (2002); AMBROSE/HIGHFIELD/LINNEMAN (2005) has shown that in particular Retail REITs can benefit from economies of scale. Retail REITs can benefit from size in terms of their negotiating position because national retailers have to be present to a certain extent in certain malls to reach their customer base.[293] Also, there is a relatively small number of players in the regional mall segment due to the large amount of capital involved.[294]

[293] Cf. MILLER, S.M./CLAURETIE, T.M./SPRINGER, T.M. (2006); AMBROSE, B.W./HIGHFIELD, M.J./LINNEMAN, P.D. (2005), page 325; ANDERSON, R.I., et al. (2002).

[294] Cf. SKT (2007), no page.

4.4.2.4 Real Estate Investment Strategies of Apartment Real Estate Investment Trust Companies

In the case of Apartment REITs, the analysis looks at Associated Estates Realty Corporation, BRE Properties, Inc., and Post Properties, Inc. BRE Properties focuses on lifestyle apartment communities in the Western United States,[295] Associated Estates Realty on high-barrier to entry submarkets,[296] and Post Apartment Homes focuses on providing resort-style garden apartments and high-density urban apartments with an emphasis on resident service and a strong brand identification.[297]

Table 40: Apartment REIT Industry Examples – Companies 1 to 3

Company Name	Sector	IPO
Associated Estates Realty Corporation	Apartment	11/11/1993
BRE Properties, Inc.	Apartment	7/28/1970
Post Properties, Inc.	Apartment	7/19/1993

Source: SNL REAL ESTATE, PFEFFER.

The overview for the degree of concentration shows that one company – BRE Properties REIT – had a degree of concentration of 1 in terms of NCREIF regions until 1996. Although the company has started to diversify geographically, its degree of focus is significantly higher than, for example, Post Properties' portfolio. With an increase in size, all three companies have become more diversified by NCREIF region and metro area. In this light, the companies have diversified more strongly by metro area than by region, which is an important finding by itself.

Table 41: Degree of Concentration – Apartment REITs Industry Examples

NCREIF	95	96	97	98	99	00	01	02	03	04	05	06
Post Proper.	0.53	0.53	0.47	0.42	0.41	0.43	0.42	0.42	0.42	0.42	0.56	0.56
BRE	1.00	1.00	0.75	0.70	0.58	0.73	0.72	0.70	0.65	0.60	0.56	0.70
Assoc. Estat.	0.82	0.83	0.71	0.71	0.69	0.66	0.68	0.66	0.67	0.68	0.67	0.76
Markets	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**
Post Proper.	0.53	0.53	0.47	0.38	0.35	0.34	0.32	0.33	0.30	0.32	0.33	0.33
BRE	1.00	1.00	0.75	0.70	0.58	0.37	0.37	0.36	0.34	0.32	0.30	0.40
Assoc. Estat.	0.52	0.50	0.39	0.34	0.30	0.29	0.30	0.29	0.28	0.28	0.27	0.30

Source: SNL REAL ESTATE, PFEFFER.

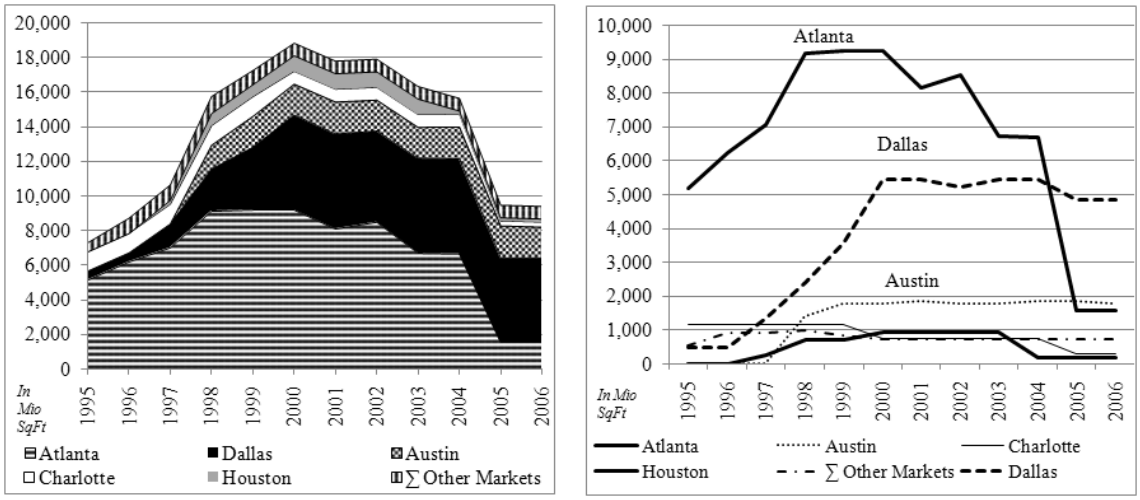
[295] Cf. BRE (2008a), no page.

[296] Cf. AEC (2008), no page.

[297] Cf. POSTPROPERTIES (2008b), no page.

Clearly, Table 41 shows that Post Properties has a strong exposure in the South-East and South-West regions. In this way, the left side of the diagram shows that the REIT grew until 2000 and then started selling nearly half of its portfolio. Interestingly, Post Properties has decreased its exposure in the South-East region, from 71% in 1995 to 17% in 2006 (in particular, Atlanta). In contrast, the REIT has increased its exposure in the South-West region, from 7% in 1995 to 73% in 2006 (in particular, Dallas). Consequently, Post Properties represents a REIT that has changed its investment strategy completely within one decade not only in terms of markets but also NCREIF region. In addition to the Atlanta and Dallas markets, only the Austin metro area represents an important part of Post Properties Portfolio. An anticipated downturn in the Atlanta office market might have caused the management decision to divest from this market.

Figure 87: Total and Individual Market Exposure – Post Properties

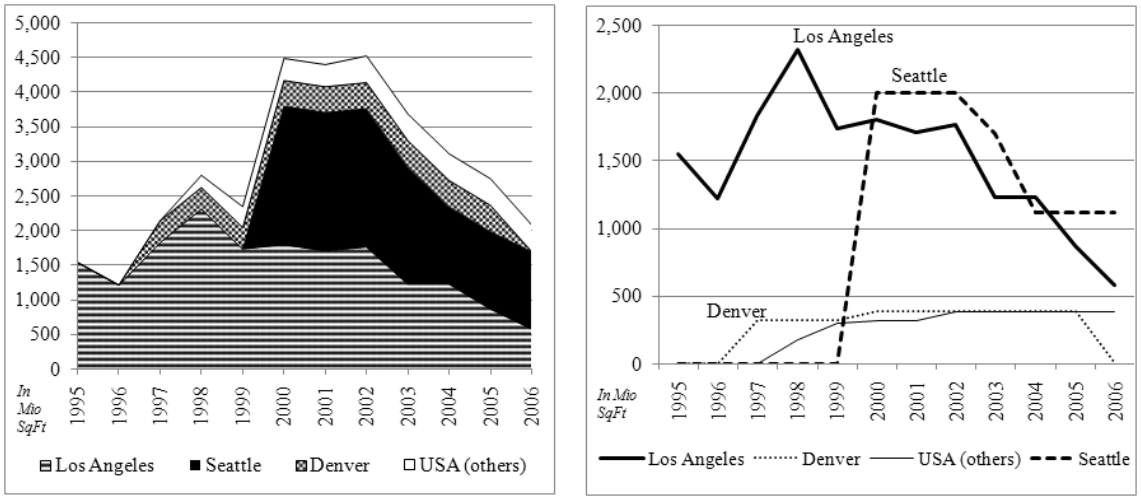


Source: SNL REAL ESTATE, PFEFFER.

Compared to Post Properties, BRE Properties, Inc. is a smaller REIT, with only 4,500 units under management in 2000. Figure 88 shows that BRE Properties, Inc. was invested entirely in the Los Angeles metro area until 1996, as shown on the left side of the diagram, before starting to expand into other areas, as shown on the right side. Beginning with the acquisition of approx. 400 units in Denver, the company continued expanding in Los Angeles to more than 2,000 units in 1998 and started buying apartment buildings in Seattle in 1999. Subsequently, the company divested heavily from all of these markets starting in 2002, particularly from the Seattle and Los Angeles metro areas. In this regard, BRE Properties, Inc. is a special case, being a REIT that

probably took advantage of decreasing cap rates during this period, as shown in section 2.1.1.[298]

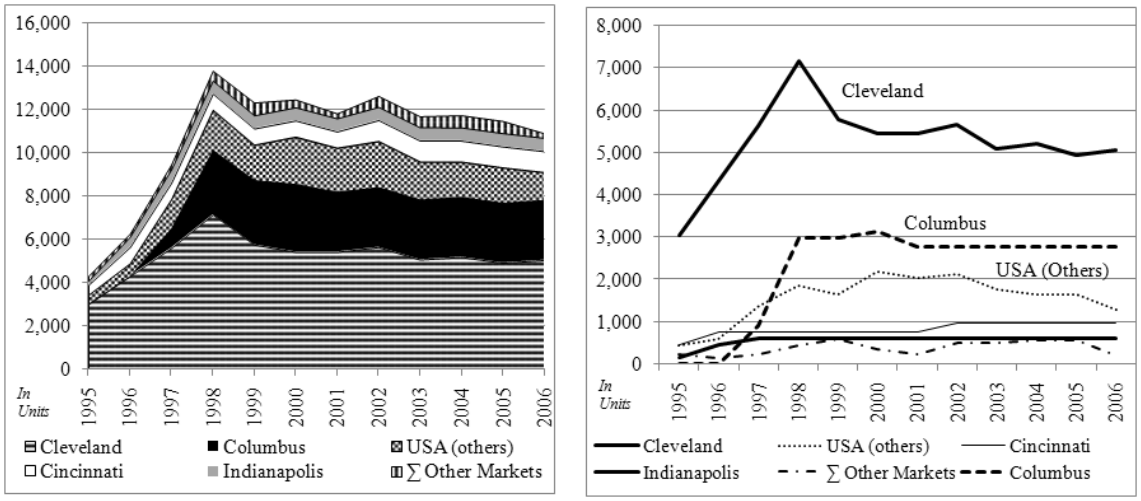
Figure 88: Total and Individual Market Exposure – BRE Properties, Inc.



Source: SNL REAL ESTATE, PFEFFER.

Looking at the exposure of Associated Estates, the three largest markets such as Cleveland represent more than 80% of the total portfolio. The growth of the total portfolio as shown on the left side took mainly place in the Cleveland and Columbus areas, illustrating the strong position of Associated Estates in the North-East region.

Figure 89: Total and Individual Market Exposure – Associates Estates Realty Corp.



Source: SNL REAL ESTATE, PFEFFER.

[298] Refer to Chapter 2.1.1, no page 10.

In addition to the East-North region, Associated Estates has property holdings only in smaller "B" markets in terms of size. In contrast to the other two companies, however, Associated Estates has not decreased in terms of portfolio size to the same extent as the other companies. In sum, the market cycle of Associated Estates should be completely different from the other two companies based on the locations of the properties.[299]

4.4.2.5 Real Estate Investment Strategies of Hotel Real Estate Investment Trust Companies

Similar to the Retail REIT sector, the Hotel REIT sector includes three subsectors of hotel real estate: "full service," "extended stay," and "limited service." "Limited-services" hotels typically do not have a restaurant and provide only limited guest services while "full-service" hotels offer more services but also have a higher room rate range. Although the differences might not be that prominent as in the Retail REIT sector, companies from these three subtypes may be affected differently by changes in the overall economy or other economic factors that determine the demand for hotel rooms. In contrast to the other sectors, the "size" is determined by the number of hotel rooms owned. As shown in the table below, the three industry examples from the Hotel REIT sector derive from three different subsectors.

Table 42: Hotel REIT Industry Examples – Companies 1 to 3

Company Name	Sector	Subsector	IPO
FelCor Lodging Trust Incorporated	Hotel	Full Service	7/21/1994
Innkeepers USA Trust	Hotel	Extended Stay	9/23/1994
Winston Hotels, Inc.	Hotel	Limited Service	5/25/1994

Source: SNL REAL ESTATE, PFEFFER.

Analyzing the degree of concentration, the table below shows that the three companies are relatively diversified, with Innkeepers USA Trust the most diversified REIT. Interestingly, the difference between the degrees of concentration by NCREIF region and MSA are not very high. This implies that these companies not only hold properties in a number of markets but also that this goes along with investing all over the country for the case of Hotel REITs. Obviously, the growth during the first years of the study

[299] Cf. AEC (2008), no page.

period has contributed to the degree of diversification because much of the expansion took place in new markets and regions.

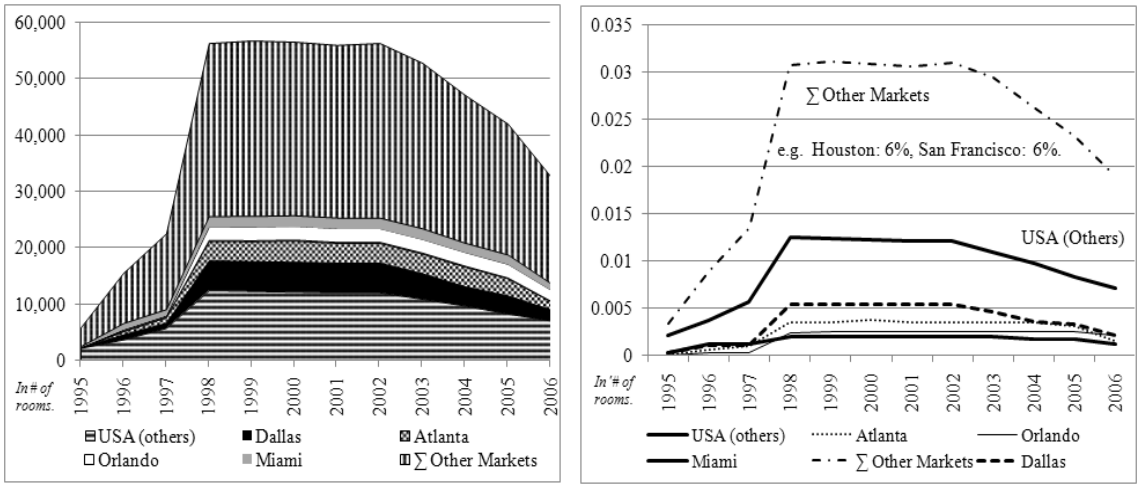
Table 43: Degree of Concentration – Hotel REITs Industry Examples

NCREIF	95	96	97	98	99	00	01	02	03	04	05	06
Felcor	0.36	0.20	0.21	0.19	0.19	0.19	0.19	0.18	0.18	0.18	0.18	0.19
Innkeepers	0.20	0.15	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.18	0.17
Winston	0.35	0.24	0.31	0.27	0.28	0.27	0.28	0.26	0.26	0.25	0.25	0.23
Markets	**95**	**96**	**97**	**98**	**99**	**00**	**01**	**02**	**03**	**04**	**05**	**06**
Felcor	0.34	0.13	0.14	0.11	0.10	0.10	0.10	0.10	0.10	0.10	0.09	0.10
Innkeepers	0.14	0.09	0.10	0.10	0.10	0.10	0.09	0.10	0.10	0.10	0.10	0.09
Winston	0.32	0.20	0.28	0.23	0.25	0.23	0.25	0.23	0.23	0.21	0.21	0.19

Source: SNL REAL ESTATE, PFEFFER.

As summarized in the figure below, Felcor does not have a particular dominant exposure in one market but focuses on the upscale segment. Rather, Felcor is a quite diversified company with holdings in different markets across the United States. Owning more than 50,000 rooms, Felcor is one of the larger Hotel REITs, with properties in every NCREIF region.

Figure 90: Total and Individual Market Exposure – Felcor



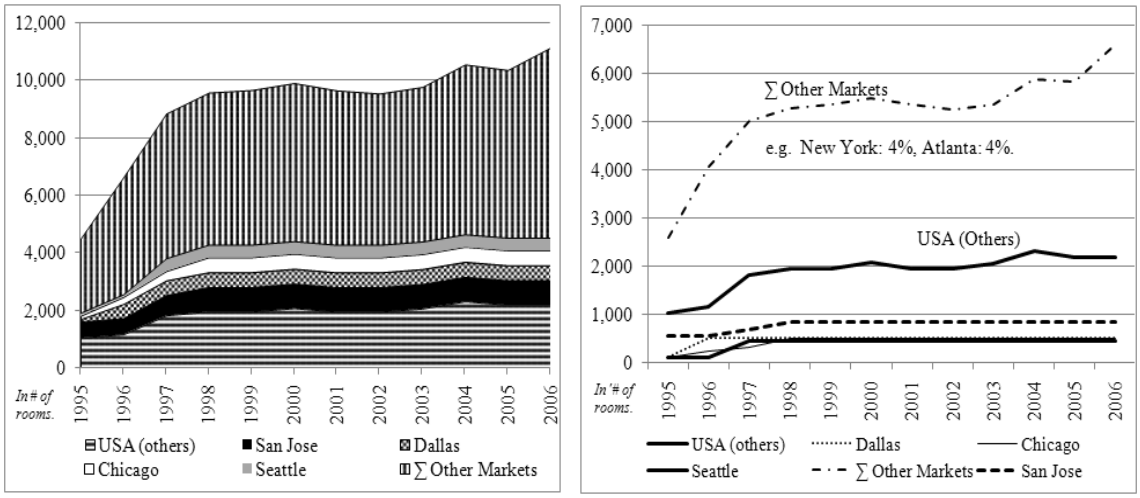
Source: SNL REAL ESTATE, PFEFFER.

In this light, the South-East region (25%) and the South-West region (20%) are the most important regions. The left side of the diagram demonstrates the growth of Felcor during the period 1995 to 1998 but also the decrease in total portfolio size after 2002.

The right side of the diagram shows that Felcor has divested or sold properties in all of its major markets.[300]

Similar to Felcor, the portfolio of Innkeepers USA Trust is spread across the whole county, meaning that the REIT is very diversified by regions and markets. Similar to Felcor, Innkeepers has property holdings in every NCREIF region. Apparently, it is important for Hotel REITs to be present in all major relevant markets for their customers. For Innkeepers, the Pacific (25%) and North-East (17%) regions are the most important markets. However, the left side of the diagram illustrates that Innkeepers USA Trust has not sold off properties to the same extent as Felcor. Despite this fact, the size of individual markets and the large share of "∑ Other Markets" and "USA (Others)" are comparable.[301]

Figure 91: Total and Individual Market Exposure – Innkeepers



Source: SNL REAL ESTATE, PFEFFER.

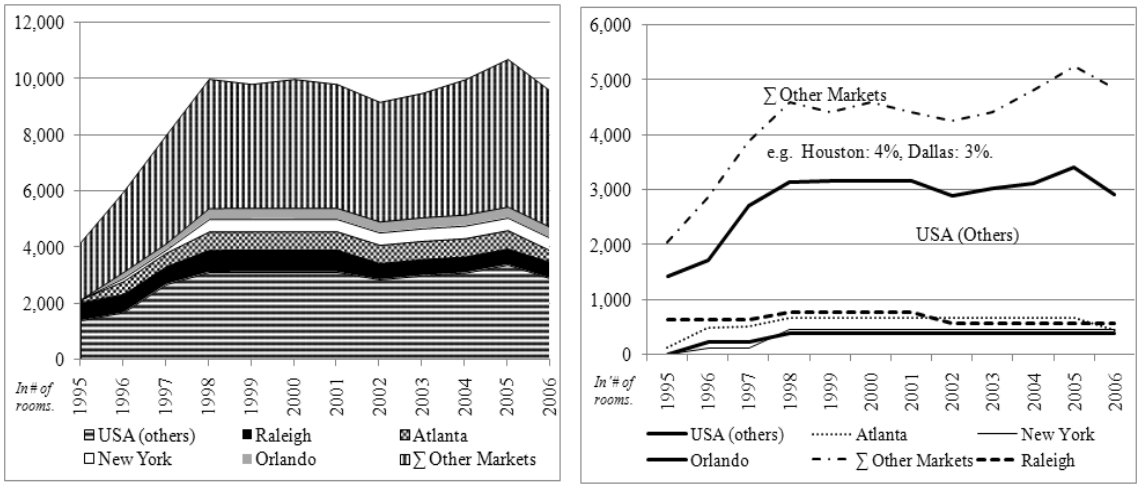
When comparing the property holdings of Innkeepers and Winston, the diagrams look very similar. This illustrates that – based on the industry examples – all Hotel REITs need to have a national presence with properties all over the country. Similar to the other two Hotel REITs, Winston manages hotels in all NCREIF regions. In total, this illustrates that Hotel REITs share similar attributes in terms of diversification by

[300] Cf. FCH (2008), no page.

[301] Cf. INKPP (2008), no page.

NCREIF region and metro area. This again differentiates the Hotel REIT sector from the other four property-type REIT sectors.[302]

Figure 92: Total and Individual Market Exposure – Winston



Source: SNL REAL ESTATE, PFEFFER.

4.4.3 Section Summary

The preceding sections analyzed:

a. the overall development of REIT sectors and companies by size,
b. the relative distribution by markets and regions,
c. the characteristics of the individual properties,
d. the development of the largest markets, and
e. the degree of concentration by markets and regions.

First, the overall increase/decrease in the size of REIT sectors during the study period reflects the dynamic development of the REIT industry. Nonetheless, the overall development differs by sectors. This means that REIT sectors had sometimes different growth periods. For example, most of the growth of OF-REITs took place between 1995 and 1998, while IN-REITs also grew their asset base significantly between 2001 and 2004. Moreover, REITs sectors were affected differently by companies going private. While some sectors such as Office or Apartment experienced a large number of companies going private, IN-REITs were not affected to the same extent.

[302] Cf. WXH (2008), no page.

Second, the relative distribution or pro-rata distribution by market/NCREIF region analysis differs significantly among sectors. This means that the relative distribution is different for every property sector. For example, the North-East region[303] varies in importance for OF-REITs versus AP-REITs. Moreover, the allocations have changed over time to a large extent and are different for every property type. This has important implications for the following analysis when the allocations are linked to the corresponding market cycles in every one of the 49 markets (and to performance afterwards).

Third, the descriptive statistics of the underlying properties demonstrate that the underlying assets are different among sectors and have changed differently over time depending on the sector. While the average size of office properties increased until 2001 and decreased subsequently, hotel properties owned by REITs have increased continuously over the whole study period. The average size of retail properties, on the other hand, remained relatively constant between 95,000 and 105,000 square feet, except during 1995 and 1996.

Fourth, the analysis of the 10 most important MSAs/markets proves that all five property types in the sample have different subsets of factors that determine the importance of certain markets, e.g., New York or Boston for office and Orlando or Miami for hotels. These differences also demonstrate that the location dynamics of properties differ among sectors (fixed sites versus changing locations). This justifies the need for a separate or sector-based analysis and demonstrates why an overall analysis of EQ-REITs leads to inconclusive results.

Fifth, the regional degree of concentration is not equal among sectors. For example, the Office sector is more concentrated than the Hotel sector. Moreover, the analysis quantifies the degree of concentration and shows that REITs are broadly diversified by regions and markets. This implies the need for a separate market analysis. If all properties were located in five markets, it would suffice to analyze the dynamics of these markets. Furthermore, the degree of concentration has changed to a different extent and in different directions across sectors.

[303] This region includes inter alia Boston and New York.

4.5 Space Market Performance and Cycles of Real Estate Investment Trusts

The aim of this section is to investigate whether REITs have outperformed the overall market in terms of their space market performance. The section measures space market performance by the weighted, average rent and occupancy levels in every quarter between 1995:Q1 and 2006:Q4 for both REIT sectors and companies. Although the space market includes further variables such as supply, demand, and net absorption as defined in chapter 2.1 and analyzed in chapter 4.3.1, occupancy rates and rent levels adequately reflect the space market characteristics, including expectations of the market participants.

It is important to note that these results do not refer to the actual rents that REITs have achieved or superior building selection within a space market. Rather, these results link the various space market cycles with the asset holdings of REITs. Consequently, higher rent or occupancy levels can be achieved only if REITs had superior market timing and selection abilities. This "space market performance" that is the result of the investment strategy of REITs scrutinizes whether REITs were able to pick markets with higher rental growth rates and occupancy levels during the study period and beat the performance benchmark, in this case, the PPR54 as a proxy for the national average for each respective sector.

4.5.1 Space Market Performance of Real Estate Investment Trusts – Sector Level

4.5.1.1 Space Market Performance of the Office Real Estate Investment Trust Sector

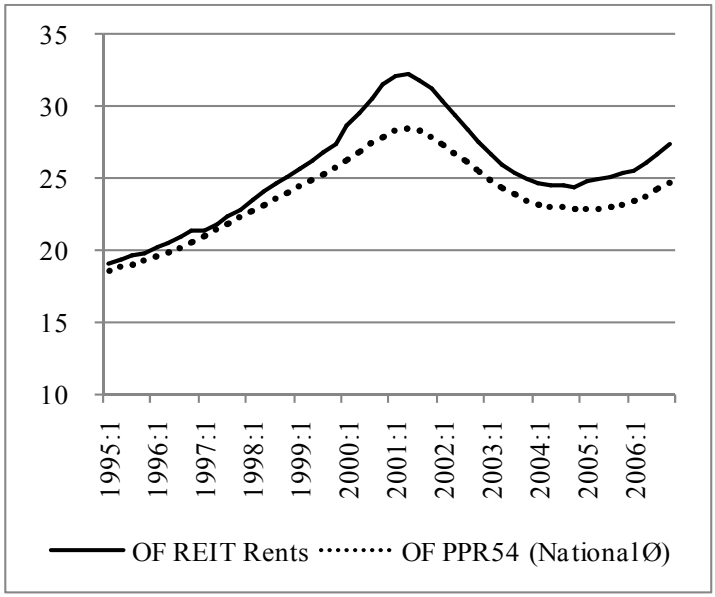
Combining the rent and occupancy levels from the 49 space markets with the corresponding relative exposure in these markets of the Office REIT sector in each respective period illustrates their performance from a market cycle perspective. Figure 93 demonstrates that OF-REITs have successfully targeted markets with higher rental levels. On average, REITs achieved higher rent levels of $1.72 per quarter only by market selection and timing.

From a relative perspective, the rental levels of REITs are more than 7% higher by overweighting markets with higher rent levels and growth rates. Market selection and

timing refer to the ability to target the markets with over-performing space market characteristics on the one hand and divest from markets with weakening space market characteristics on the other hand.

Noticeably, REITs have benefited from their strong exposure in the Californian markets that benefited most from the New Economy boom until the second quarter of 2002, with an average rent level of over $32 in total. Also, the relatively high ratio of office buildings in New York owned by REITs in comparison to the national average contributed to these high rent levels. Nonetheless, the bursting of the New Economy bubble and the events of the 9/11 attacks affected OF-REITs quite significantly. This resulted in a sharp decrease in rent levels that continued until 2004:Q4.

Figure 93: Weighted Rent Levels of Office REITs versus PPR54 Office



Outperformance Rent	
$ 1.72	Ø Difference absolute
7.22%	Ø Difference relative

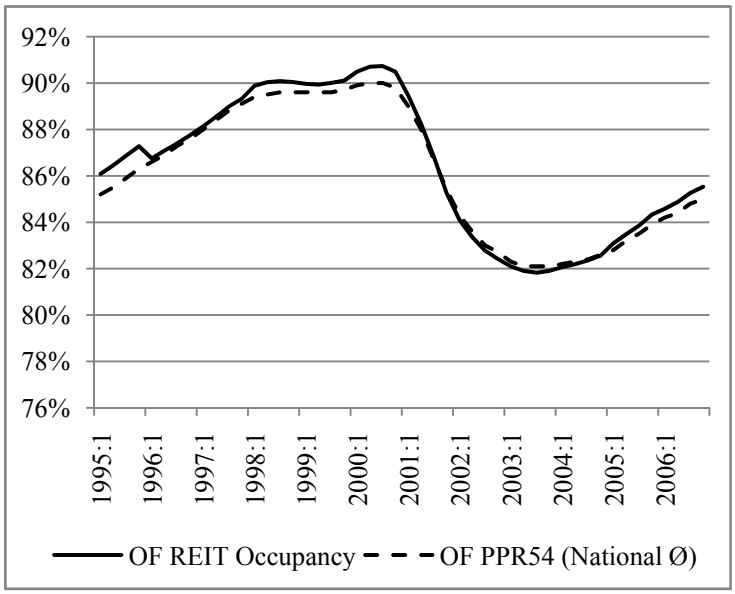
Source: SNL REAL ESTATE, PFEFFER.

Nonetheless, the diagram shows that most of the space market outperformance resulted from the period after 1997. Since Office REITs changed their investment strategies from secondary markets to primary markets such as New York starting in 1998, Office REITs maintained a strong presence in these markets with higher rent levels through 2006. Before that time, the Office REIT sector was a fairly good representative of the overall investable universe of office properties in the United States.

Comparing the occupancy levels of the OF-REIT sector that is based on their market selection, there are no significant differences compared to the overall market

represented by the national average. Although the occupancy levels of the OF-REIT sample are slightly higher, with 0.27% in percentage points absolute or 0.32% relative, the discrepancies are not as noticeable. These are the market-weighted rent and occupancy averages based on the exact exposure by market.

Figure 94: Weighted Occupancy Levels of Office REITs versus PPR54 Office



Outperformance Occupancy	
0.00%	Ø Difference absolute
0.30%	Ø Difference relative

Source: SNL REAL ESTATE, PFEFFER.

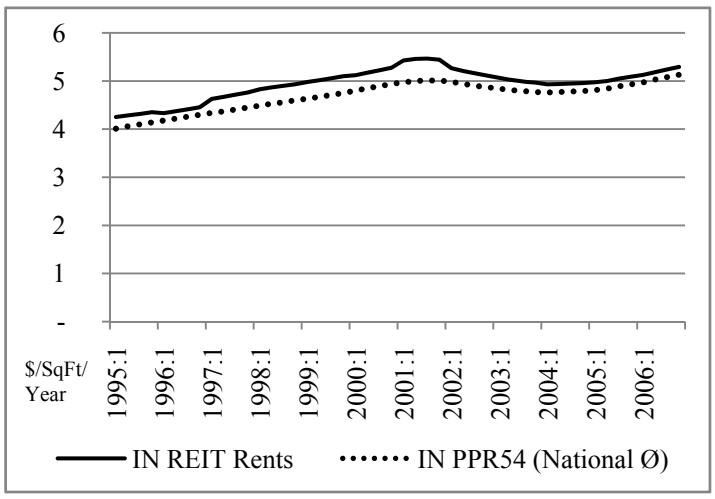
Based on the present data, it can be shown that OF-REITs targeted space markets with higher rental levels than the overall national market. Nonetheless, the aggregated, weighted occupancy levels in these markets are comparable to the weighted national average. As shown in chapter 4.4, REITs have over-weighted large space markets such as New York or San Francisco. Because REITs were able to attract large amounts of capital in the stock market, OF-REITs were major buyers of large office buildings. Therefore, the median size of office properties increased from 84,000 square feet in 1995 to approximately 102,000 square feet in 2001.[304] During this period, the net average numbers of office properties held by the sample REITs increased from 327 in 1995 to 2,558 in 2001. Again, the space market performance is based on space market selection and timing, not property selection *within* a space market.

[304] Cf. Chapter 4.4.1.1, p. 167.

4.5.1.2 Space Market Performance of the Industrial Real Estate Investment Trust Sector

Similar to the Office REIT sector, Industrial REITs have targeted - and overweighted in comparison to the national average - space markets with higher rent levels than the overall market, for example, Boston, New York, San Francisco, and Honolulu. All of these markets had average rent levels higher than $6/Square Feet/Year over the period 1995 to 2006. Comparable to the Office REIT sector, the Californian industrial space markets have outperformed most other markets, benefiting from the increasing trade with China, as shown in chapter 4.3.1.2.[305] This resulted in an average difference in rent of $0.32 per quarter in comparison to the total market, or an outperformance of 6.76%. In particular, the shortage in industrial space and high rent levels in the Californian markets during the period 1997:Q2 to 2002:Q2 contributed to this outperformance by market selection. Clearly, Industrial REITs have outperformed the market over the complete 12-year time span.

Figure 95: Weighted Rent Levels of Industrial REITs versus PPR54 Industrial



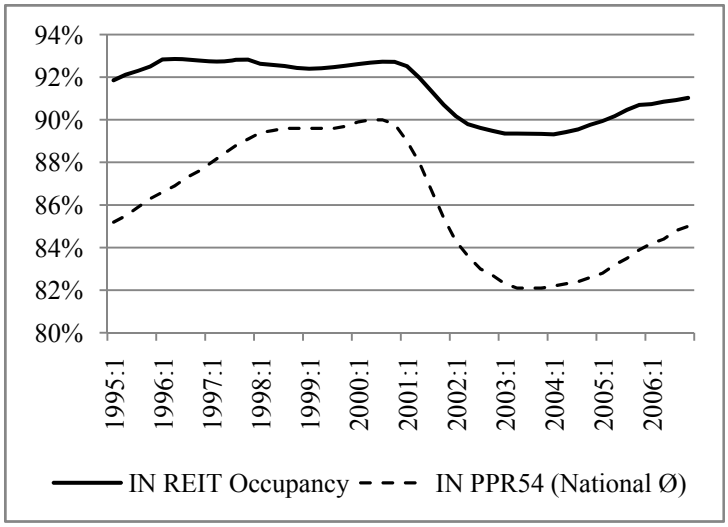
Outperformance Rent	
$ 0.26	Ø Difference absolute
5.52%	Ø Difference relative

Source: SNL REAL ESTATE, PFEFFER.

In contrast to the Office REIT sector, Industrial REITs also achieved significant higher occupancy levels, as shown in Figure 96. Precisely, Industrial REITs achieved occupancy levels that were more than 5 percentage points higher. In particular, the strong exposure to the San Francisco and Los Angeles industrial space markets caused the high occupancy and rent levels.

[305] Refer to Chapter 4.3.1.2, p. 132.

Figure 96: Weighted Occupancy Levels of IN-REITs versus PPR54 Industrial



Outperformance Occupancy	
5.28%	Ø Difference absolute
6.13%	Ø Difference relative

Source: SNL REAL ESTATE, PFEFFER.

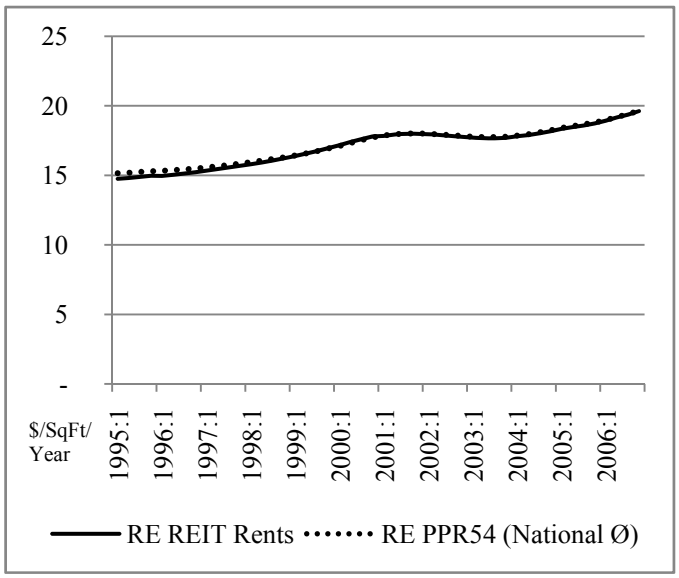
Unlike the Office REIT sample, the Industrial REIT sector has clearly achieved higher rent and occupancy levels. This illustrates that Industrial REITs had even better market selection abilities than Office REITs. As a consequence, Industrial REITs' space market outperformance that should result in a higher profitability on a company level is based on both market cycle indicators. In addition, the space market cycle of the Industrial REIT sector as well as that of the Office REIT sector illustrate the cyclical movements REITs are subject to. Furthermore, the investigation illustrates how the market selection and timing abilities can contribute to the outperformance of REITs in comparison to the overall market.

4.5.1.3 Space Market Performance of the Retail REITs

Investigating the weighted rent levels of Retail REITs shows that this sector has realized the same weighted rent levels as the national average. This means that the space market selection of this sector reflects – on average – the benchmark more or less precisely over the whole period of investigation. This implies that if REITs realized higher actual rents, this is related to more competitive properties and better management or property selection, not by choosing space markets with higher rent levels. Furthermore, the explanatory power of the comparison of the Retail REIT market with the PPR54 is limited because of the large share of "USA (Others)." The share of "USA (Others)," which covers the "B" and "C" metro areas and micro areas, is approx. 40%. Since this

share is multiplied with the PPR54 as the national average, there is not much potential for outperformance due to the limited availability of space market data on "B" markets.

Figure 97: Weighted Rent Levels of Retail REIT versus PPR54 Retail

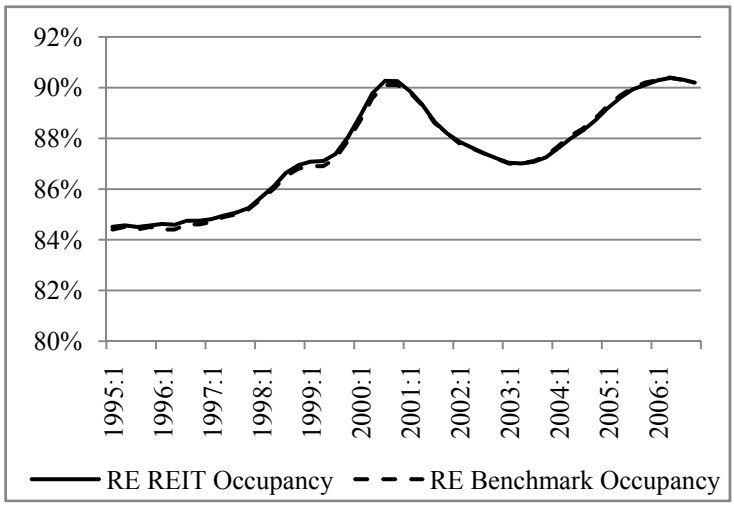


Outperformance Rent	
$(0.11)	Ø Difference absolute
-0.65%	Ø Difference relative

Source: SNL REAL ESTATE, PFEFFER.

By linking the rent data for the 49 markets for every quarter with the property holdings of Retail REITs, Figure 98 demonstrates that while the rent levels of Retail REITs were slightly lower than the benchmark (less than 1% lower) the occupancy levels were slightly higher (less than 1% higher). These results differ from the findings for the Industrial and Office REITs samples.

Figure 98: Weighted Occupancy Levels of Retail REITs versus PPR54 Retail



Outperformance	
0.00%	Ø Difference absolute
0.06%	Ø Difference relative

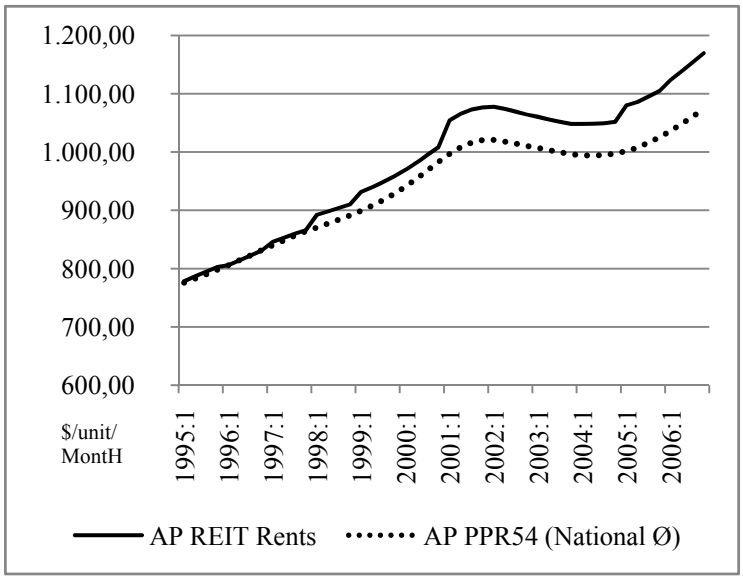
Source: SNL REAL ESTATE, PFEFFER.

Consequently, all three subsectors have chosen different space markets. Thus, Office and Industrial versus Retail REITs have not chosen the same market selection strategy on an aggregate level in terms of occupancy and rents (regional malls and shopping centers are often outside the large MSAs). Therefore, the explanatory power of the market cycle picture of Retail REITs is limited to the large share of the "USA (Others)."

4.5.1.4 Space Market Performance of Apartment Real Estate Investment Trust s

Based on the results as shown in Figure 99, Apartment REITs chose markets with lower rent levels in comparison to the national average rental rate for apartment units. In contrast to the first three sectors, rental levels are compared by the average rent per apartment per month (not $/SqFt/Year). Also, the diagram shows that REITs are overrepresented in markets with lower rent levels than the national average. In particular, REITs have a relatively low exposure in the markets with the highest rent levels, especially New York with an average rent of approximately $2,250 per unit per month.

Figure 99: Weighted Rent Levels of Apartment REITs versus PPR54 Apartment



Outperformance Rent	
$ 39.60	Ø Difference absolute
4.20%	Ø Difference relative

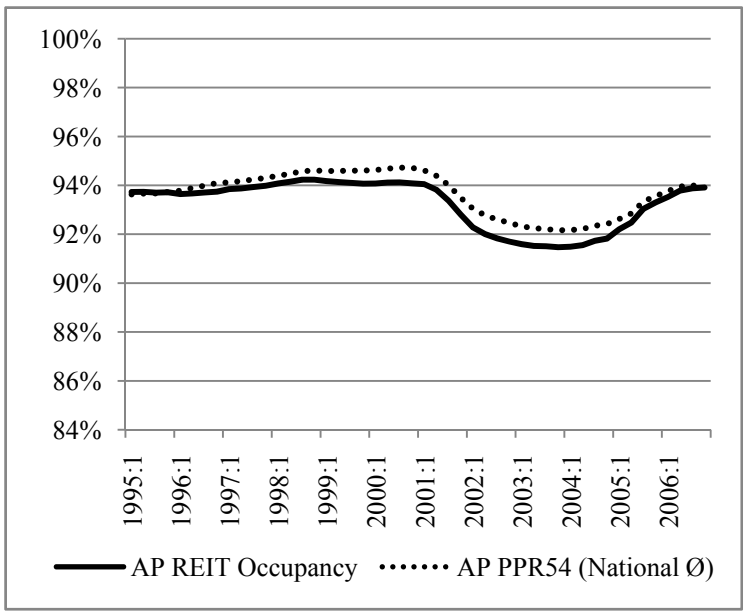
Source: SNL REAL ESTATE, PFEFFER.

Precisely, the average weighted share of REIT-owned apartment properties of the "New York-Northern New Jersey-Long Island, NY-NJ-PA (Metro)" is only 1.6% over the study period. For example, the Apartment REIT sample contains only approximately

1,300 units owned by REITs in New York for 2005. In contrast, the share of the New York metro area is more than 15% of total stock that is reflected in the PPR54 Apartment rent benchmark. Therefore, the comparison is based on the PPR54 rent benchmark excluding New York. This demonstrates that space market selection strategies differ significantly among REIT sectors. Consequently, the diagram confirms that the weighted rent levels of Apartment REITs are more than 20% lower by linking the asset holdings with the space market rent levels. Moreover, the cyclical movements are less noticeable than for the Office REIT sector, for example.

Similarly, the occupancy levels are also lower for the Apartment REIT sector. The drop in occupancy levels of the Apartment REIT sector between 2001:Q1 and 2005:Q1 resulted from strong exposure in Atlanta and Houston. Both markets experienced a sharp increase in vacancy during this period but recovered during 2006. Nonetheless, occupancy rates of the markets Apartment REITs are invested in were 2% lower on average than the national average. This does not necessarily mean that Apartment REITs have achieved lower rents, but higher rents must then derive from buildings with higher quality and service levels, for example. In addition, the occupancy levels of the Apartment REITs had a larger variance than the national average.

Figure 100: Weighted Occupancy Apartment REITs versus PPR54 Apartment



Outperformance	
0.22%	Ø Difference absolute
-0.50%	Ø Difference relative

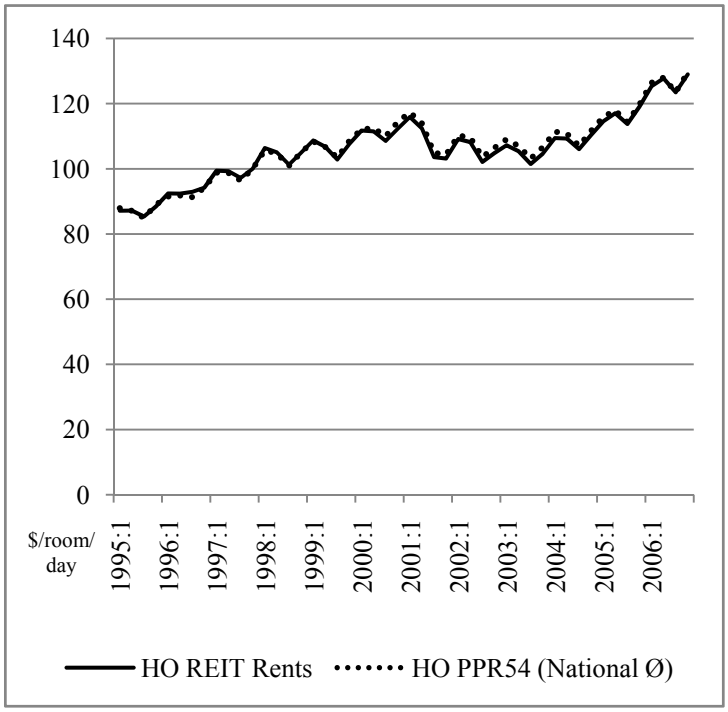
Source: SNL REAL ESTATE, PFEFFER.

4.5.1.5 Space Market Performance of the Hotel Real Estate Investment Trust Sector

Similar to the Apartment REIT sector, rents are measured by the room for hotel real estate (Average Daily Room Rate). Different from the other sectors, however, rents (in this case, room rates) are measured by an index based on PPR and STR market research.[306] Visibly, room rates are more volatile and include seasonal influences, in contrast to the other sectors. Furthermore, room rates adjust more quickly to changes in demand and supply.

Figure 101 clearly demonstrates the seasonal – in this case yearly – hotel cycle. Nevertheless, room rates have continuously increased except for a sharp decrease after the events of 9/11. REITs were affected to the same extent as the overall market. Comparable to the Retail REIT sector, Hotel REITs do not have targeted markets with significantly lower or higher rent levels. Precisely, the difference is less than 1% in percentage basis point and relatively.

Figure 101: Weighted Rent Levels of the HO-REIT Sector versus PPR54 Hotel



Outperformance Occupancy	
$ (0.61)	Ø Difference absolute
-0.58%	Ø Difference relative

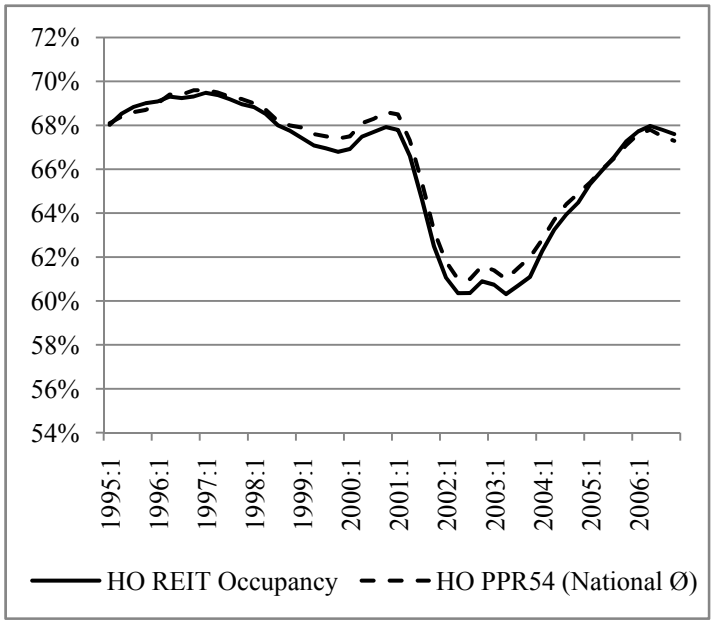
Source: SNL REAL ESTATE, PFEFFER.

Analyzing the occupancy levels of Hotel REITs and the overall market reveals a similar picture. There are only small discrepancies in terms of occupancy rates. In this context,

[306] Cf. PPR (2007a), no page.

Figure 102 shows the sharp drop in occupancy after the terrorist attacks in September 2001. Although occupancy is measured as a moving average, occupancy dropped from around 68% to about 60% within two quarters. In this light, it took the Hotel sector until the second quarter of 2003 to start recovering from this external shock. Except for this, the difference in occupancy levels was less than 1% in the overall hotel space market.

Figure 102: Weighted Occupancy Levels of Hotel REIT Sector versus PPR54 Hotel



Outperformance Occupancy	
-0.32%	Ø Difference absolute
-0.48%	Ø Difference relative

Source: SNL REAL ESTATE, PFEFFER.

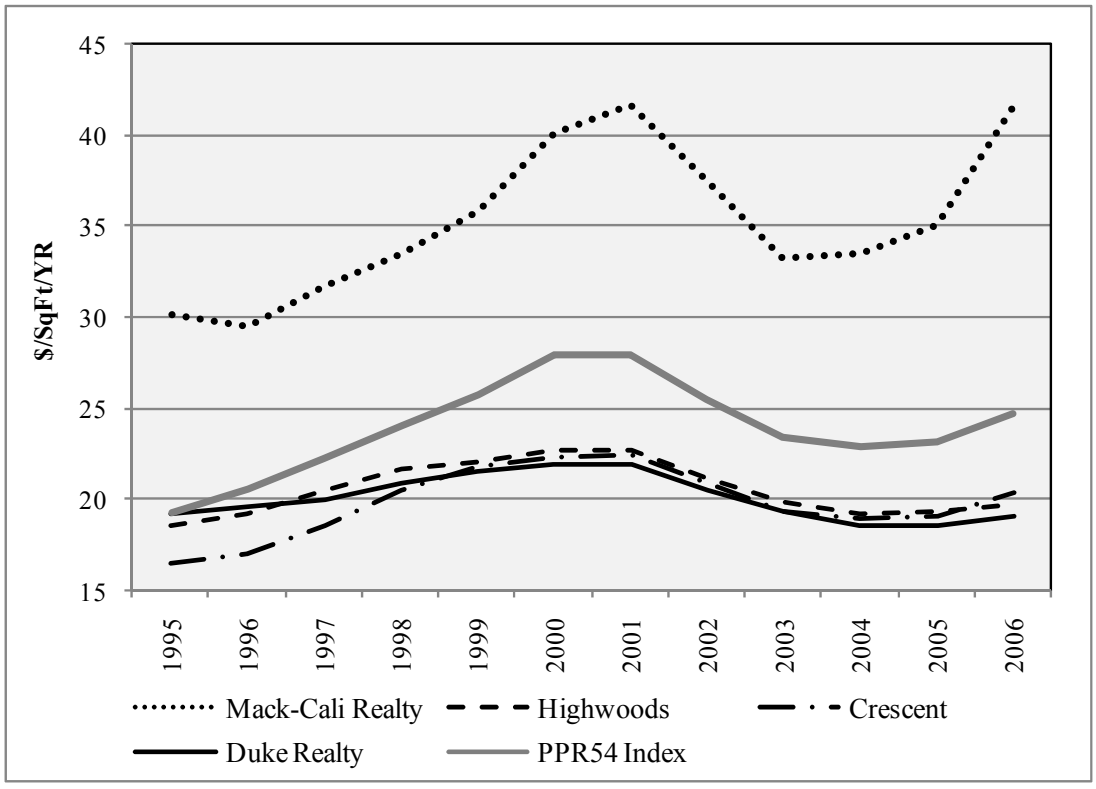
4.5.2 Space Market Performance of Real Estate Investment Trusts – Company Level

As described in the chapter 3.5, the space market performance pictures the weighted rent and occupancy levels of individual REITs. In this way, the quarterly space market data is combined with the property holdings of REITs over the study period. Although the analysis uses "growth rates" (rental and occupancy change) in most cases, the following sections describe the absolute rent and occupancy levels because they are intuitively comprehensible. Consequently, the aim of this chapter is to illustrate the theoretical market cycles of individual companies as well as differences between companies of one sector. If there were no significant differences, company-specific market cycle analysis would be obsolete.

4.5.2.1 Space Market Performance of Office Real Estate Investment Trust Companies

Figure 103 depicts the rent levels of four Office REITs picked from the sample. The diagram shows that all Office REITs seem to follow the overall trend of the national average for office real estate in general. In addition, the figure illustrates that rent levels among different companies can be significantly different based on the locations of their properties. As shown, only one of the four REITs – the Mack-Cali Realty Corporation – is invested in markets that have higher rent levels than the PPR54 Index. Furthermore, the rental levels of the markets that Mack-Cali Realty is invested in seem to be more volatile. Combining the findings of chapter 4.3.6 (rent levels of MSAs) and chapter 4.4.2.1 (property holdings of Mack-Cali Realty), the large exposure in the New York office markets that benefited and then suffered from the New Economy boom explains the large change between 1998 and 2002.

Figure 103: Rents OF-REITs versus PPR54 Office – OF-REITs 1 to 4



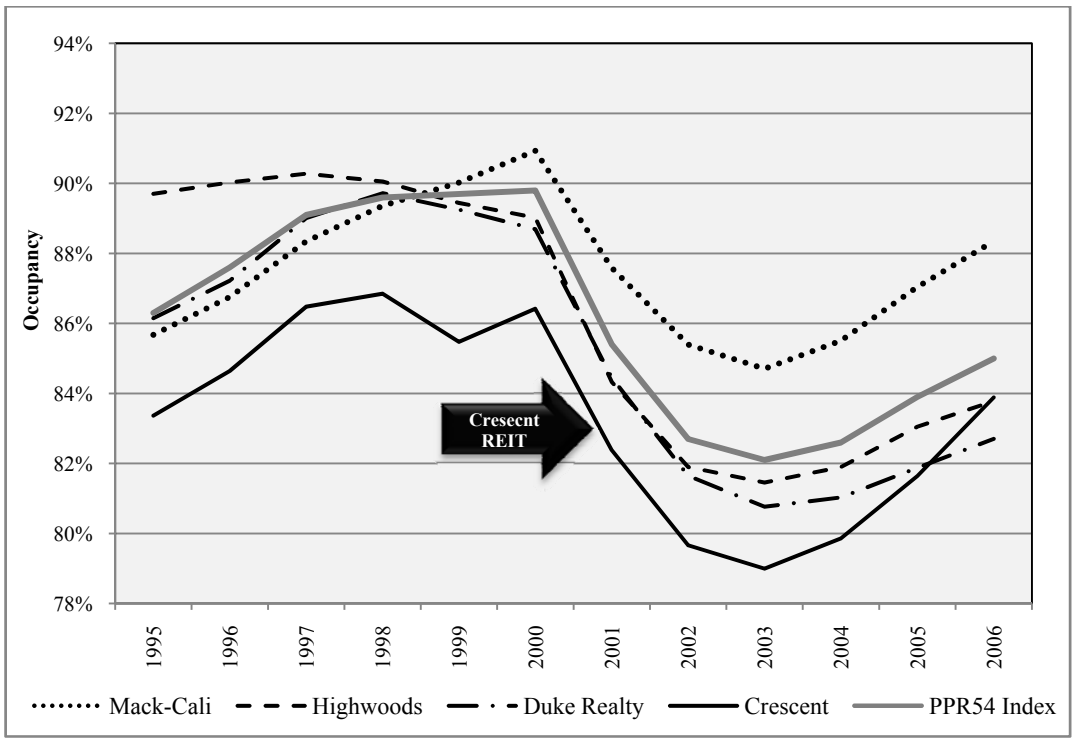
Source: SNL REAL ESTATE, PFEFFER.

In sum, these results imply that investors can or may be able to invest in Office REITs with higher rent levels or a different volatility by means of rent changes, but they are still subject to the overall trend in terms of the space market development, in this case the office rent levels. Moreover, the turning point (from increasing to decreasing rent

levels) of Mack-Cali Realty occurred two quarters later than the overall markets and the other REITs. While all REITs and the overall markets were affected by the economic downturn starting in 2001:Q1, Mack-Cali Realty was influenced less by the economic downturn beginning in 2001 and more by an external effect – the 9/11 attacks – based on the company's focus on the North-East NCREIF regions.

Similar to the development of the rent levels, the occupancy levels of REITs follow the overall market trend. Although Mack-Cali Realty had by far the highest rent levels, as shown in the diagram above, the company's occupancy levels by market exposure remained under the national average until 1999:Q2. Except for the downturn after the 9/11 attacks, the REIT has benefited from the favorable development of the New York office markets. This illustrates the different market cycle investors are subject to when investing in different individual REIT companies.

Figure 104: Occupancy OF-REITs versus PPR54 Office – OF-REITs 1 to 4



Source: SNL REAL ESTATE, PFEFFER.

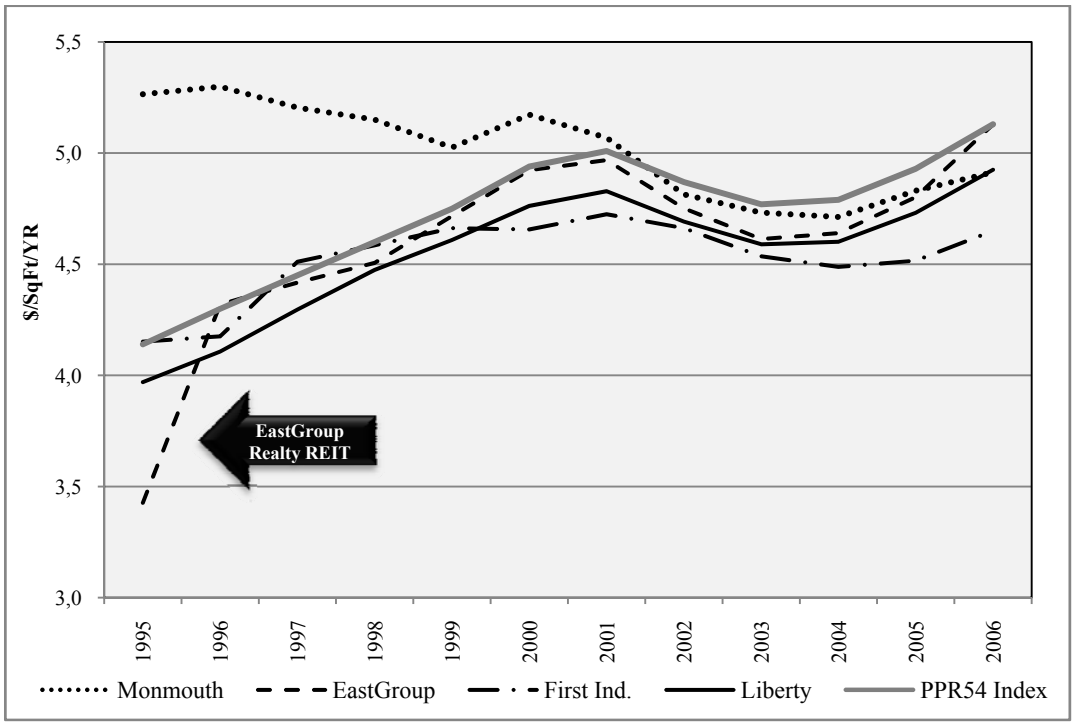
Furthermore, the diagram above shows that occupancy levels are not aligned as closely as rent levels. Nonetheless, the two diagrams suggest that companies with higher rent levels by their market exposure have higher occupancy levels. Since rent levels or the price of space is determined by the demand and supply of space mirrored in the

occupancy levels, it is logical that MSAs with higher occupancy levels have higher rent levels. This also implies the different market cycle positions of individual MSAs.

4.5.2.2 Space Market Performance of Industrial Real Estate Investment Trust Companies

When analyzing the rent levels of the first four Industrial REITs in the sample, not all rent levels follow the overall market trend. As highlighted, the rental cycle of Monmouth Industrial REIT is different from its peers. Monmouth invests in net-leased industrial properties with long-term leases to investment-grade tenants.[307] Starting at a significant higher rent level in 1995:Q1, the rent levels of the Monmouth REIT could be characterized by a sideward movement (or slow decrease), in contrast to the other three Industrial REITs and the overall market.

Figure 105: Rents IN-REITs versus PPR54 Industrial – IN-REITs 1 to 4



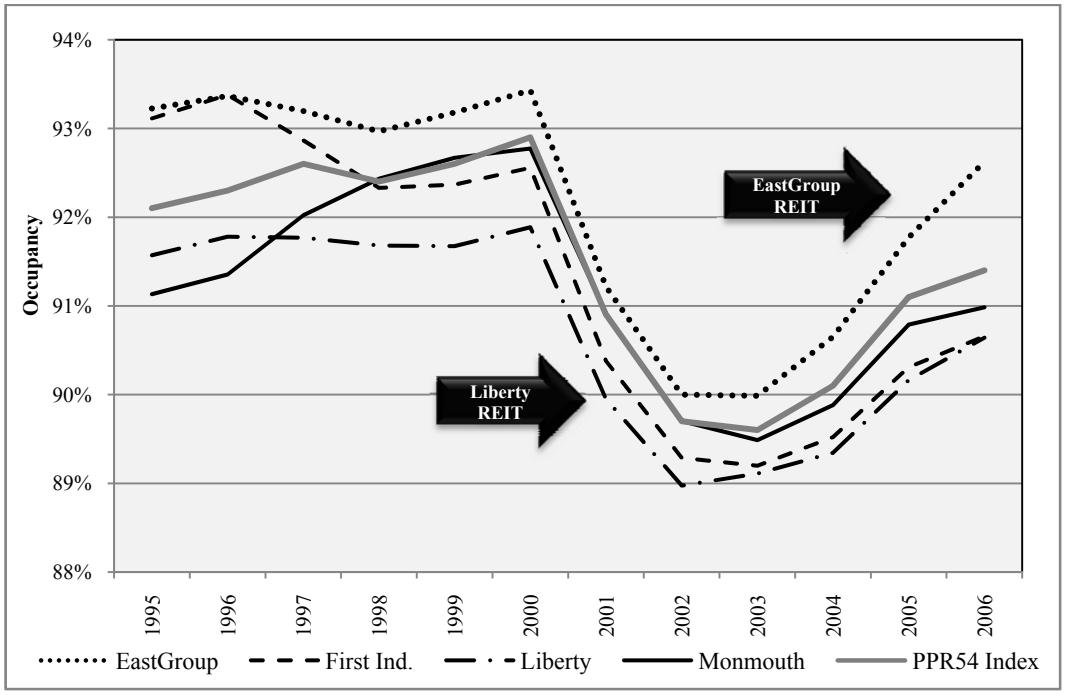
Source: SNL REAL ESTATE, PFEFFER.

In contrast, EastGroup Properties' rent level jumped from $3.50 to more than $4.00 in one quarter. Again, this is related to the investment strategy of the REITs and the respective space market exposure. For example, EastGroup Properties expanded into the

[307] Cf. MNRTA (2008), no page.

Los Angeles market with acquisitions of more than 500,000 square feet and into the San Francisco market with nearly 800,000 square feet in 1996 alone. This changed the market cycle of the company significantly, as shown in the diagram below. The aforementioned additional acquisition by EastGroup Properties affected the rental cycle of the company but did not change the weighed occupancy level of the portfolio, as shown in the diagram below. In contrast to the rent levels, all five occupancy cycles seem to follow the same upwards and downwards trend. Also, the steps in the PPR 54 National average for industrial real estate illustrate the fact that this benchmark is set by a research company (Property Portfolio Research) in even percentage points. Liberty, as the Industrial REIT with the lowest occupancy levels, has strong a position in markets such as Philadelphia that did not keep pace with other markets and regions in terms of their economic base, which determines space markets factors (rents and occupancy).

Figure 106: Occupancy IN-REITs versus PPR54 Industrial – IN-REITs 1 to 4



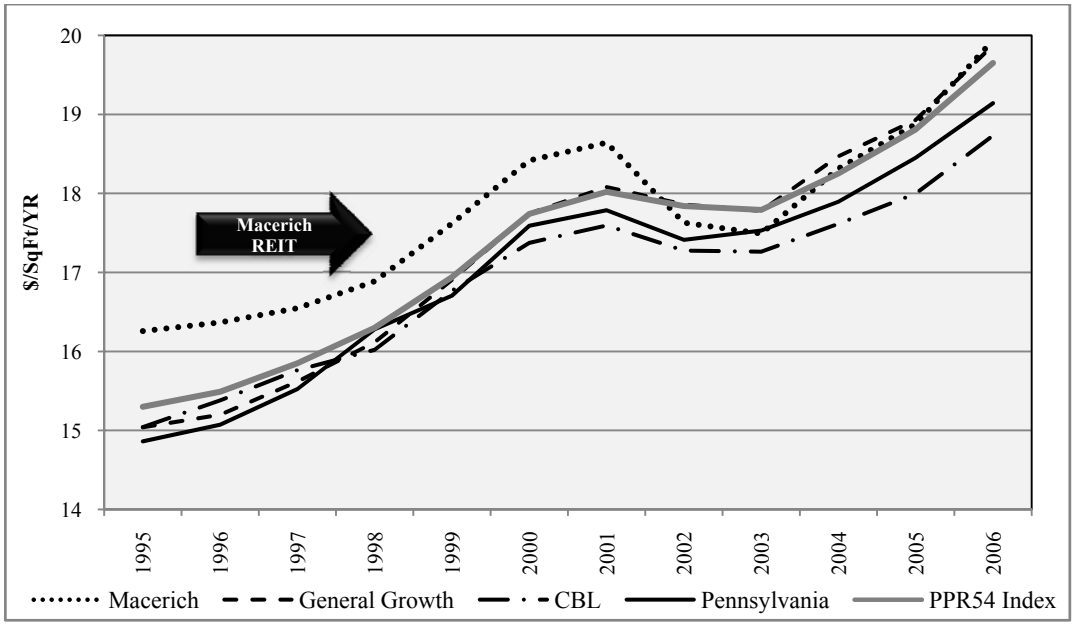
Source: SNL REAL ESTATE, PFEFFER.

4.5.2.3 Space Market Performance of Retail Real Estate Investment Trust Companies

As shown in Figure 107, only one REIT had significantly higher rent levels than the other Regional Mall REIT. In this context, the Los Angeles and San Francisco MSAs with very high rent levels represented 33% of Macerich's portfolio in 1995. Due to

Macerich's investment strategy, this percentage decreased to 15% in 2001:Q1 (Los Angeles, 11%, and San Francisco, 4%). This change was not caused by sales of properties in these markets but by acquisitions in other markets. For example, Macerich increased its property holdings in the Phoenix MSA from zero in 2001 to more than 12 million square feet in 2002. This of course influenced the company's rental cycle, as shown below. Apart from this fact, all Regional Mall REITs seem to follow the overall (mostly positive) market trend, which was different from the Industrial and Office REIT sectors.

Figure 107: Rents RM-REITs versus PPR54 Retail – RM-REITs 1 to 4

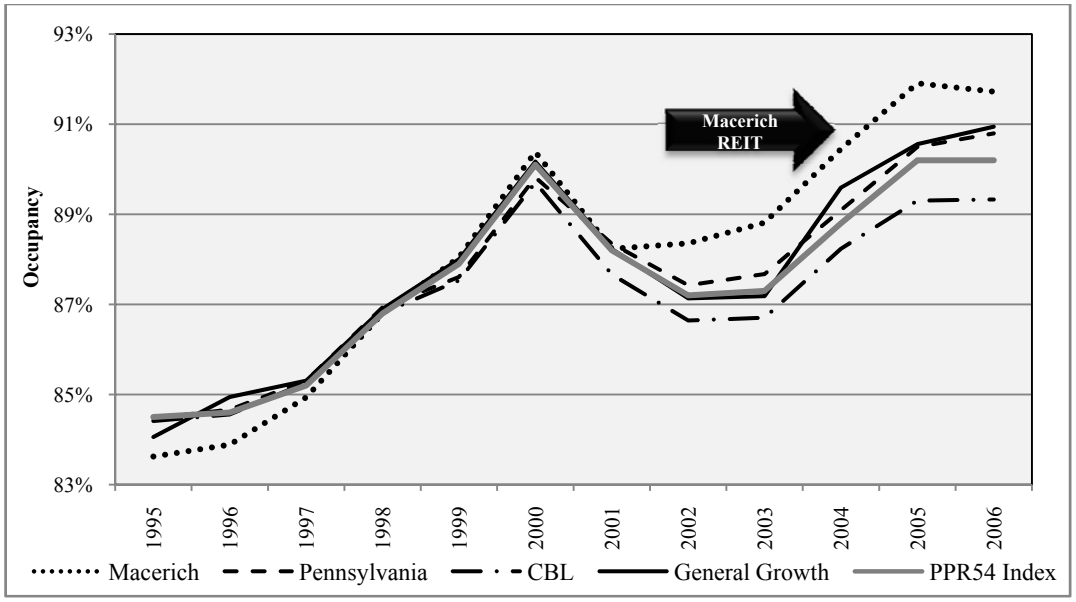


Source: SNL REAL ESTATE, PFEFFER.

In contrast to the development of Macerich's rent levels, the investment strategy increased Macerich's occupancy levels, meaning that the management successfully targeted markets with above-average occupancy levels. In particular, the occupancy levels in the Phoenix market increased from 92.1% in 2002:Q2 to 100% in 2006:Q2 before declining again.

As a consequence, the above-average occupancy levels in Macerich's most important markets in Phoenix and the Pacific region contributed to the outperformance of the company by means of their space market characteristics. This demonstrates the importance of management decisions regarding exposure to certain markets and metro areas that directly affect the company's physical market cycle.

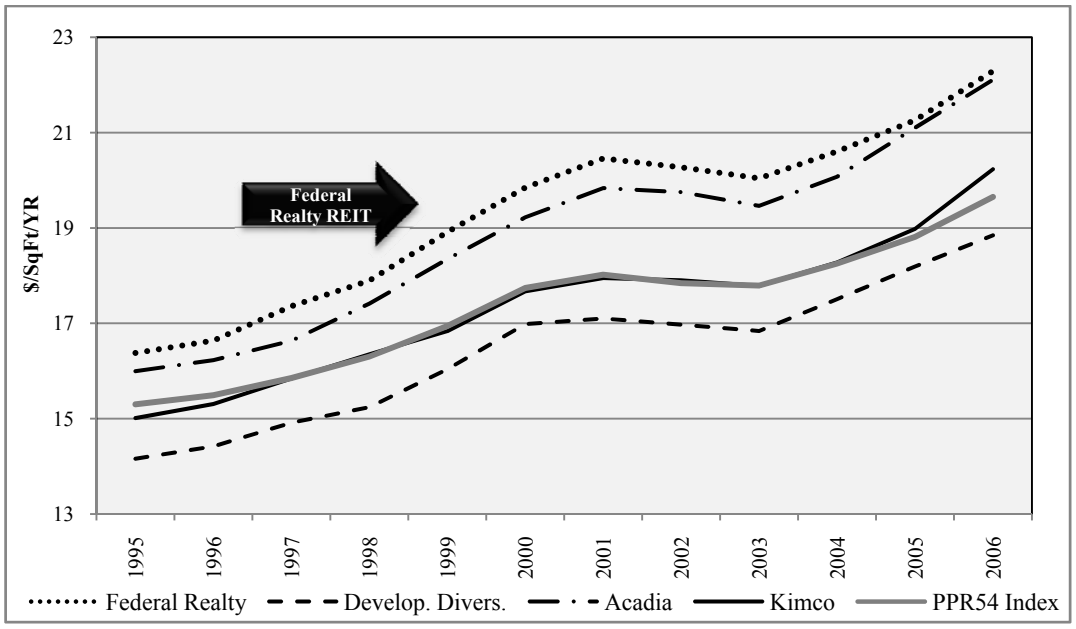
Figure 108: Occupancy RM-REITs versus PPR54 Retail – RM-REITs 1 to 4



Source: SNL REAL ESTATE, PFEFFER.

Having described the market cycle characteristics of four Regional Mall REITs, the analysis shows additional examples from the Retail REIT sector (including Shopping Center, Retail: Other, or additional Regional Mall REITs) below, which show similar results in terms of rents for the Shopping Center REITs. Also, the rents follow the same overall trend. Nonetheless, the explanatory power is limited because the analysis cannot differentiate between shopping center and regional mall rents.

Figure 109: Rents of REITs versus PPR National Average – SC-REITs 1 to 4

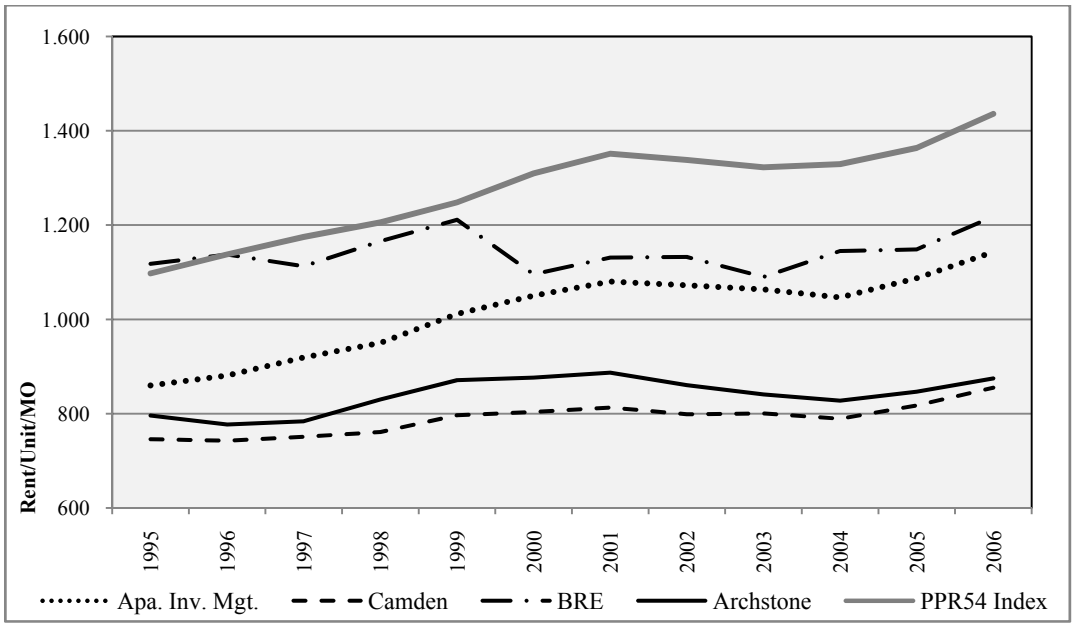


Source: SNL REAL ESTATE, PFEFFER.

4.5.2.4 Space Market Performance of Apartment Real Estate Investment Trust Companies

In terms of the rent levels of Apartment REITs, the Apartment REIT sector and its companies are subject to a more stable market cycle caused by the different characteristics of apartment real estate, such as a very diverse and granular tenant base. Since the demand for apartments seems to be less dependent on economic factors than, for example, hotel real estate, and more on demographics, the rent development appears to be more stable. The sharp decline in 2000 and 2001 of BRE Properties was caused by the acquisition of a portfolio of more than 2,000 apartments in the Seattle market that had a lower rental level than the prior portfolio average. Consequently, BRE Properties' weighted rent level by market exposure declined by more than $100. This demonstrates the effect management decisions in terms of acquisitions and disposal of properties have on the performance of the underlying real estate assets.

Figure 110: Rents AP-REITs versus PPR54 Apartment – AP-REITs 1 to 4



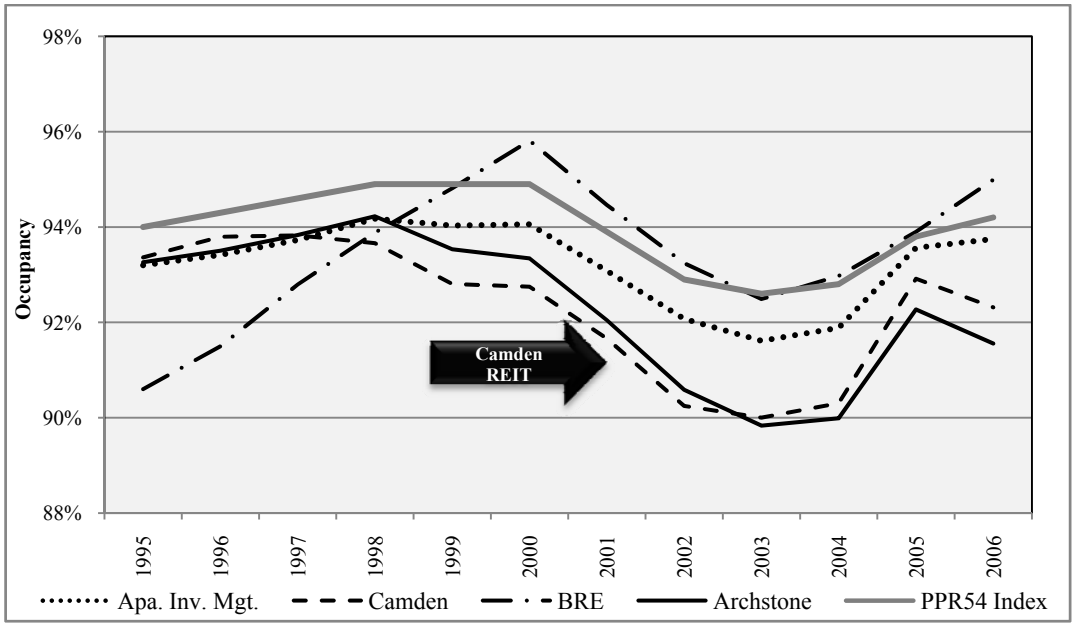
Source: SNL REAL ESTATE, PFEFFER.

In addition, the acquisitions in the Seattle market that represented approx. 45% of BRE Properties' portfolio during this time decreased its occupancy levels further in addition to the overall downturn of apartment real estate after 2001. As illustrated in the diagram below, all Apartment REITs faced difficult times in terms of occupancy in their space markets until 2005:Q2. Due to relatively low interest rates and improving economic fundamentals, an increasing number of people who belonged to the customer base of

Apartment REITs were able to buy houses instead of renting (Home Ownership versus Rental Units). This changed beginning in 2005 when house prices reached all-time highs in several markets. This improved the market environment by means of occupancy for the Apartment REIT sector. Additionally, the diagram shows that an individual Apartment REIT can have significantly different occupancy rates from its peers, the same as rent levels.

In this light, the diagram pictures four Apartment REITs that all have a strong regional focus: BRE Properties, Inc. in the Pacific, Apartment Investment Managers and Archstone Smith in the South East/West, and Camden Properties in the South-West/Mountain region (all by NCREIF region). Therefore, Camden Properties' and Archstone Smith's market cycles are more closely aligned.

Figure 111: Occupancy AP-REITs versus PPR54 Apartment – AP-REITs 1 to 4

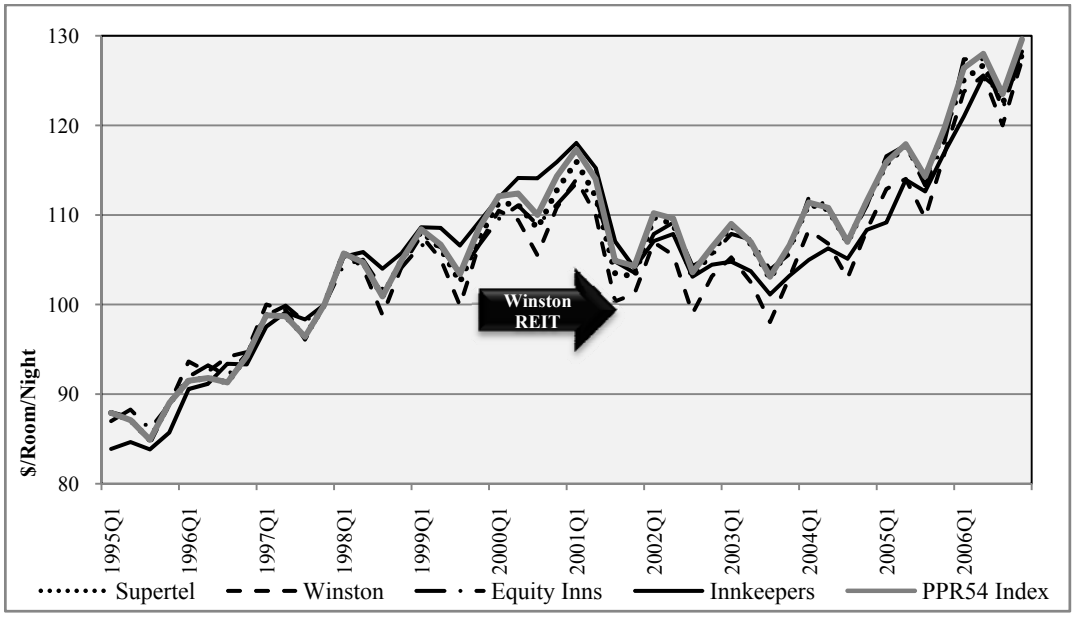


Source: SNL REAL ESTATE, PFEFFER.

4.5.2.5 Space Market Performance of Hotel Real Estate Investment Trust Companies

Compared to the other four sectors, the Hotel REIT sector has completely different space market dynamics. As shown in the diagram below, there are no significant differences between the space market developments in terms of rents between the different Hotel REITs. Figure 112 clearly shows the seasonal component that investors in Hotel REITs are subject to. Except for smaller discrepancies as highlighted for Winston REIT with a larger exposure in New York, the market cycles are relatively uniform. Since all REITs are represented in all NCREIF regions and typically are spread over the whole country (less focus), the space market cycles are not very different.

Figure 112: Rents HO-REITs versus PPR54 Hotel – HO-REITs 1 to 4

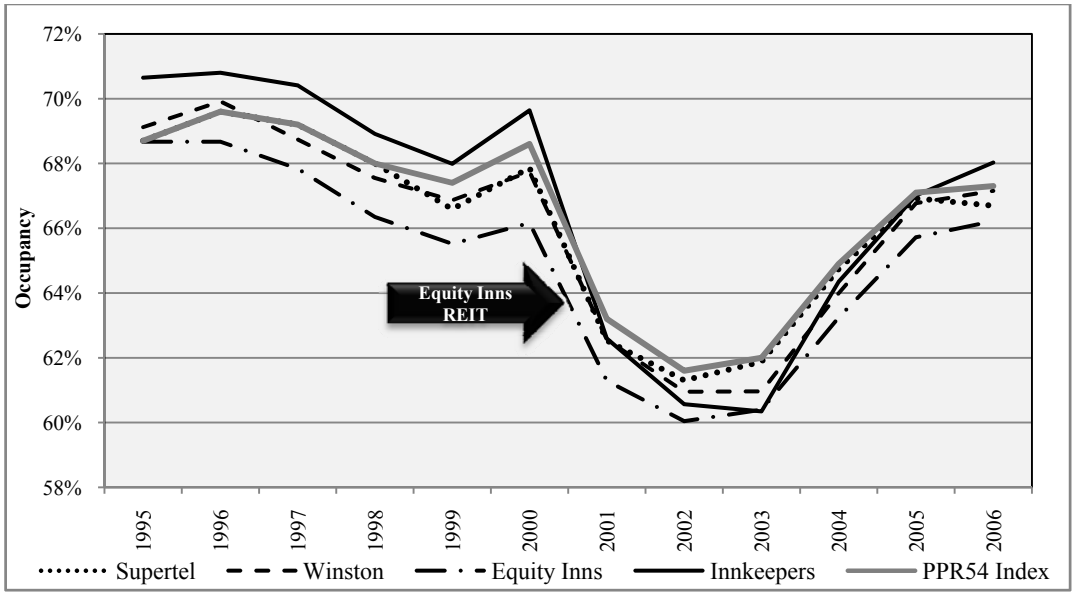


Source: SNL REAL ESTATE, PFEFFER.

Turning to the occupancy levels, there seem to be larger differences in terms of occupancy levels than in rent levels. Again, the REITs with the lower occupancy levels also tend to have lower rent levels due to their market exposure. In contrast to the rent levels, the occupancy levels do not seem to be as "seasonal" as the rent levels.

On the other hand, occupancy levels – expressing the average number of rooms as a weighted average – dropped sharply after the economic downturn and the 9/11 attacks in 2001. Although the rental cycle may be influenced by other factors such as inflation, it took Hotel REITs until 2006 to achieve occupancy levels that were similar to those in 2001.

Figure 113: Occupancy HO-REITs versus PPR54 Hotel – HO-REITs 1 to 4



Source: SNL REAL ESTATE, PFEFFER.

4.5.3 Section Summary

Having described the development and characteristics of space markets, the theoretical "space market cycle" of REIT pictured here is the logical consequence of the investment strategies of REITs. By combining the exact property holdings of REITs in each market over time with the corresponding quarterly space market data, the investigation has provided evidence of the following:

- All five REIT property-type sectors outperformed the overall market over the complete 12-year study period in terms of their space market performance based on market selection and timing abilities.[308]
- Space market cycles of REITs on a company level follow the overall sector trend but with significant discrepancies among companies.
- Acquisition/sales strategies have a significant impact on the space market performance such as shown for the Apartment REIT BRE.
- Hotel REIT space market cycles are different from the four traditional REIT sectors.

[308] Outperformance in this context can only arise from overweighting outperforming and divesting from underperforming markets not from building quality or being overweighted in metro areas like New York compared to micro areas with lower rent levels.

- The outperformance of REITs is even likely to be understated for sectors such as Retail where the market "USA (Others)" has a large share.

Nonetheless, this represents only the theoretical rent and occupancy levels, which should be reflected in the *actual* earnings of REITs. Consequently, the following section aims to verify whether there is a significant link between the aforementioned space market performance and the earnings on a company level. Furthermore, the question whether – and if yes – there are time lags between the space market performance and earnings/pricing of REITs has not been solved. Therefore, the rational step is to investigate links and time lags, which are presented in the following section.

4.6 Signaling Function of Space Market Cycles and Earnings of REITs

The aim of this section is to illustrate the link between space market cycles and the profitability and pricing of REITs. In this way, the section applies the methodology presented in the preceding sections for five REIT sectors ("portfolio manager's view") and various REIT companies of each sector ("stock analyst's view"). The chapter follows the order of the hypotheses. Due to the large number of separate, statistical analyses conducted for each sector and company, every section starts with an overview of the most important results. Thereafter, the most important associations found during the course of the analysis are presented.

The aim of the cross-correlation function and time-lag analysis (CCF-/Lag-Analysis) is not a proof or causality ("Cum hoc ergo propter hoc") but to analyze the forecasting function of space market fundamentals. Also, the summary shows significant only time lags and the highest coefficient, which represents the strongest association between the series. The findings are grouped into four parts:

- Occupancy (Change) with Rent (Change)
- Space Markets Fundamentals with Operating Performance by FFO
- Space Markets Fundamentals with Pricing by FFO Multiples and Stock Price Change
- Profitability by FFO with FFO Multiples (Change) and FFO with Stock Price Changes

The findings describe only significant cross-correlations by means of a minimum correlation coefficient and statistical significance. If there is no significant relationship, the fields are left empty. The results shown are all significant ($p = 0.05$) under consideration of the critical t-values (between 2.01 and 2.02, depending on the respective lags/periods for the quarterly data) and the effective degree of freedoms. Based on the number of periods investigated, the minimum significant cross-correlation coefficient is at least 0.30, depending on the number of lags and periods included.[309]

[309] The appendix is excluded in the printed version. Refer to http://adsabs.harvard.edu/.

4.6.1 Time Lags and Association between Space Market Factors of REITs

4.6.1.1 Sector-level Results for Space Market Factors

The relationship between rental growth rates and occupancy is of particular importance because these are the two most important space market cycle parameters in the CCF-/Lag-Analysis. Table 44 illustrates that the dynamics of rental growth rates and occupancy (change) are different for the five sectors investigated in this study.

As shown, the Office REIT sector seems to have the largest time lags between space market factors. Although the link between occupancy change and rental growth rates is similar to the Industrial REIT sector and the Apartment REIT sector,[310] it takes longer until rental growth rates are reflected in the occupancy levels of a REIT. For example, a rent increase in the physical market cycle of a Retail REIT of 5% is likely to be reflected in a high occupancy level two quarters later. In addition, the results on a sector level suggest that it takes up to seven quarters until occupancy levels (positive or negative) are reflected in rent levels. Referring to the long duration of rental contracts of five or even 10 years in the office sectors, the findings appear to be reasonable.

Table 44: Quarterly Lags and Association Space Market Factors of REITs – Sector Level

Occupancy (Change) with Rent (Change)	Office	Industrial	Apartm.	Retail	Hotel
1 OCCUP_CHANGE with RENT_CHANGE	Lag 4	Lag 4	Lag 4	Lag 2	Lag -1*
2 RENT_CHANGE with OCCUPANCY	Lag 2	Lag 1	Lag 0	Lag 2	Lag 2
3 OCCUPANCY with RENT	Lag 7	Not sign.	Lag 0	Not sign.	Lag 0

* Hotel REITs are the only sector where Rent_Δ leads Occup_Δ by one quarter. The time lag refers to Rent_Δ leading Occup_Δ including a correction for the seasonal component.

Source: Own calculation.

Moreover, the findings imply that based on the space market data provided by PPR (2007a), Industrial and Apartment REITs have a shorter time lag in terms of their ability to benefit from positive rent changes and increase their occupancy levels than Office but longer than Retail and Hotel REITs. Altogether, the findings reflect the characteristics of the underlying property sectors in terms of rent contract length. The findings for the Hotel REIT sector show a different relationship between occupancy change and rent change where rent change leads occupancy change. Furthermore, the time lags are the shortest of all four sectors. Taking into consideration the daily pricing of room rates,

[310] Rental "growth" rates can be negative or positive.

this appears to be reasonable. This means that an increase in hotel room rates (ADR) in quarter one is likely to be reflected in an occupancy increase in the following quarter and a high occupancy after two quarters. This would also result in a higher RevPAR. Since there is a time lag between the two factors, it can be said that changes in the average daily room rates can be interpreted as a lead variable for occupancy. This means that there is a positive, significant association between these two factors. In addition, the results suggest that high room rates coincide with high occupancy levels and the same quarter. Again, this is due to the particular dynamics of hotel real estate. Since the calculation of rent levels of hotel real estate by PPR (2007) differs from the other four sectors due to the seasonal component of hotel real estate, the findings are subject to certain limitations, as specified in chapter 3.2.2.[311]

Link 1: Occupancy Change with Rental Growth Rates

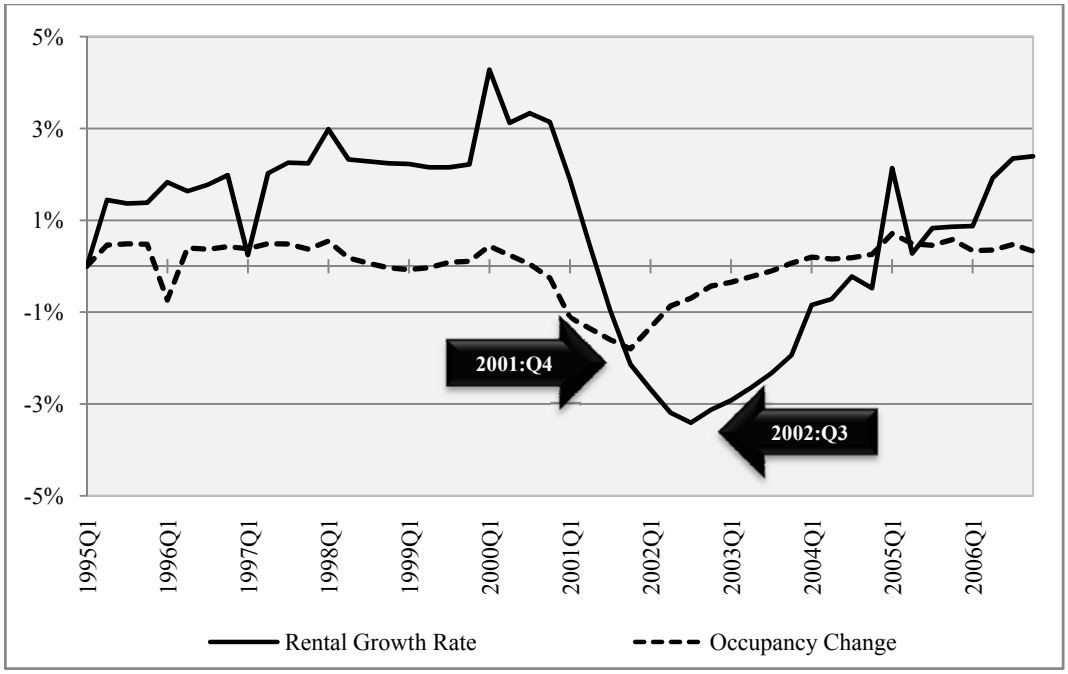
Since the overall results have been presented, the following paragraphs give examples to illustrate the results of the analysis. For example, Figure 114 shows the rental growth rates and occupancy changes of the Office REIT sector. By the visual analysis of the actual two time series on the left side, the results suggest that occupancy changes lead rental growth rates. Nonetheless, the a) strength of relationship and b) exact time lag in quarters cannot be determined by a visual examination.

In the next step, the CCF analysis shows that the strongest association between the two time series is not a T0 (k=0) but at a time lag of four quarters (k+4), as shown in Figure 115. Although there often is a significant association without including time lags between space market factors (this refers only to the link between space market factors), the association increases by including time lags.

In this way, the positive coefficients with positive time lags illustrate that occupancy changes lead rental growth rates. If the significant positive coefficients were on the left side (negative time lags), this would be an indication that rental growth rates lead occupancy changes.

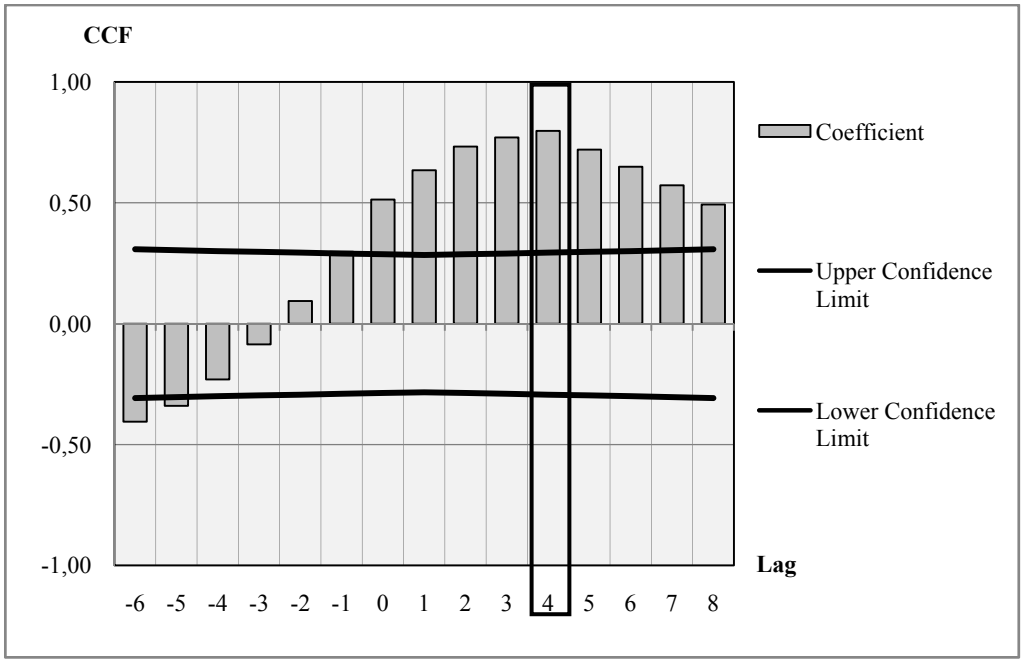
[311] Refer to Chapter 3.2.2, p. 73.

Figure 114: Occup_Change with Rent_Change – Office REIT Sector



Source: SNL REAL ESTATE, PFEFFER.

Figure 115: CCF Occup_Change with Rent Change – Office REIT Sector

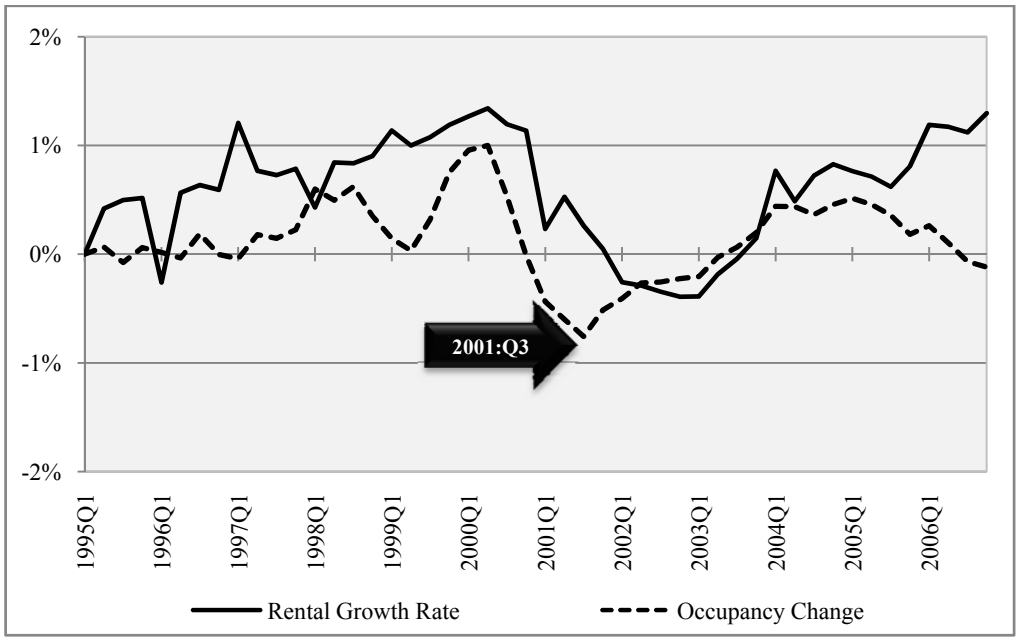


Source: SNL REAL ESTATE, PFEFFER.

Comparing the results of the Office REIT sector with the results of other REIT sectors, for example, Retail REITs, Figure 116 shows that the principles underlying the dynamics of occupancy change and rental growth rates are the same, but the time lags and intensity are different. Overall, the two sectors seem to move in the same direction,

but the variance of the growth rates of the Retail REIT sector is smaller (ranging from plus 1.5% to less than minus -1%).

Figure 116: Occup_Change with Rent_Change – Retail REIT Sector



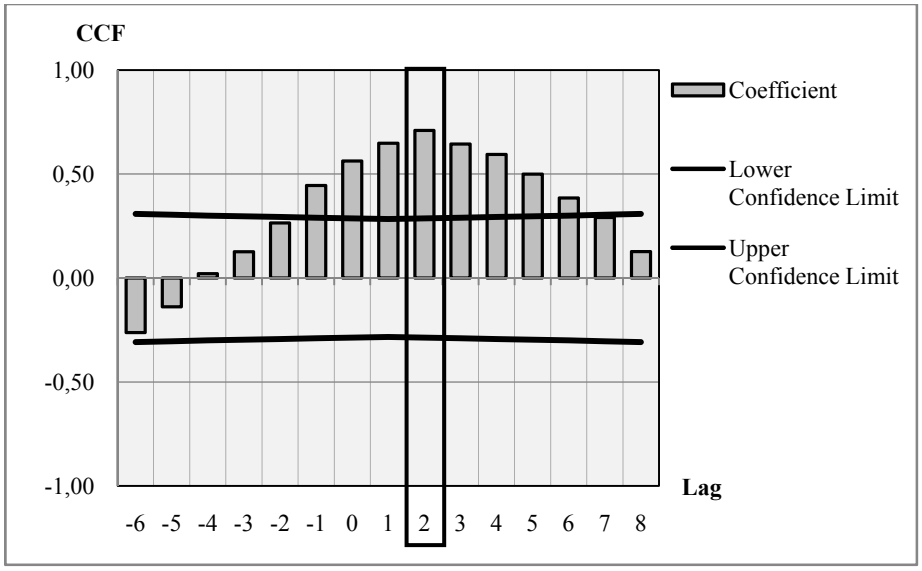
Source: SNL REAL ESTATE, PFEFFER.

This demonstrates that the Retail REIT sector has been less volatile (more stable) than the Office REIT sector in terms of the range of occupancy and rental growth rates. In addition, the two time series seem to be more aligned, meaning that they have smaller time lags than the Office REIT sector. Taking into consideration that Retail REITs have shorter leasing cycles and often participate in the sales of their tenants, these findings appear to be justifiable.

Turning to the results for the Retail REIT sector as shown in Figure 117, the results are similar to the results for the Office REIT sector. Nonetheless, the highest coefficient is found at a different time lag, meaning that occupancy change leads rental growth rates by two quarters. In practice, this means that a change in occupancy is very likely to be reflected in a rent change of the overall portfolio after half a year.

In this light, the fact that the coefficients are at positive lags (k+N) suggests that occupancy change leads rental growth rates. Also, the coefficients are clearly above the confidence limits for the respective number of periods included. The results for the other sectors are similar and support the findings as shown for the Office and Retail REIT sectors.

Figure 117: CCF Occup_Change with Rent_Change – Retail REIT Sector

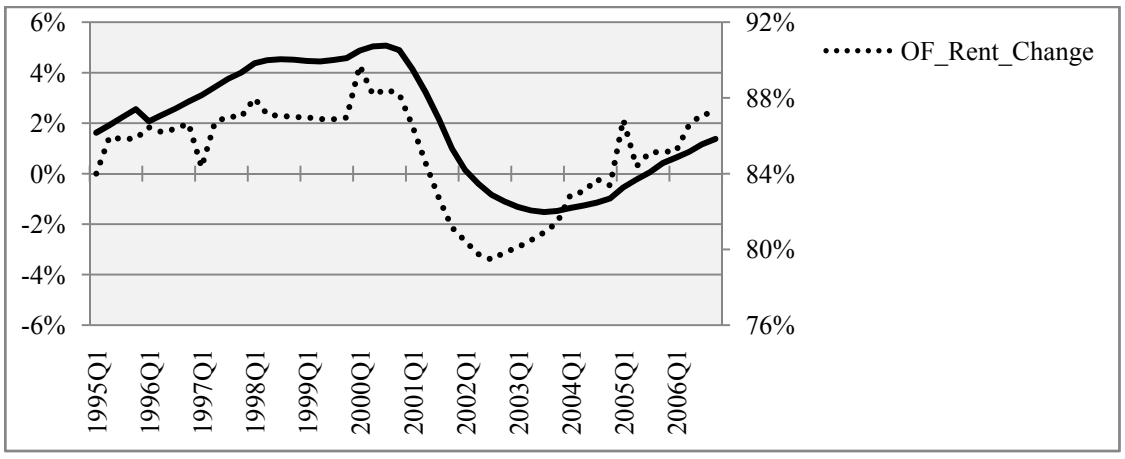


Source: SNL REAL ESTATE, PFEFFER.

Link 2: Rental Growth Rates with Occupancy

Analyzing the development of rental growth rates and occupancy levels, Figure 118 illustrates that rental *growth rates* lead occupancy *levels*. In addition, the diagram illustrates that the movement of rental growth rates is more volatile than occupancy levels. This means that the occupancy-level time series does not have spikes comparable to rental growth rates. In sum, the two time series seem to move in the same direction but with a time lag that will be analyzed in the following paragraph.

Figure 118: Rent_Change with Occupancy Quarterly − Office REIT Sector

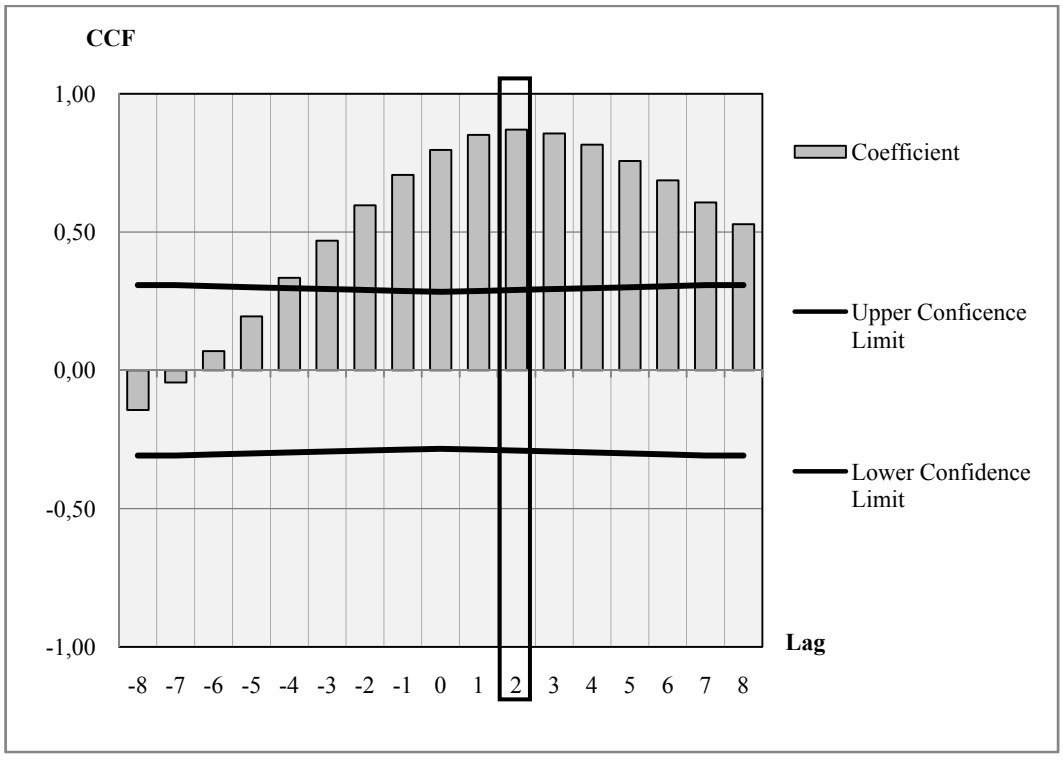


Source: SNL REAL ESTATE, PFEFFER.

Based on the results of the analysis shown in Figure 119, the strongest association between the two time series is at a lag of two quarters. Before and after k+2, the coefficient that represents the strength of the relationship between the two factors decreases. In this light, the diagram illustrates that there is more than one significant coefficient, for example, at a lag of one quarter, but the strongest association is at lag two.

This reflects the movements described in the preceding paragraph. Since the results are similar for all five sectors, as shown in the summary of the findings in Table 44, the analysis continues with the next link between occupancy and rent levels without describing each individual REIT sector.

Figure 119: CCF Rent_Change with Occupancy – Office REIT Sector



Source: SNL REAL ESTATE, PFEFFER.

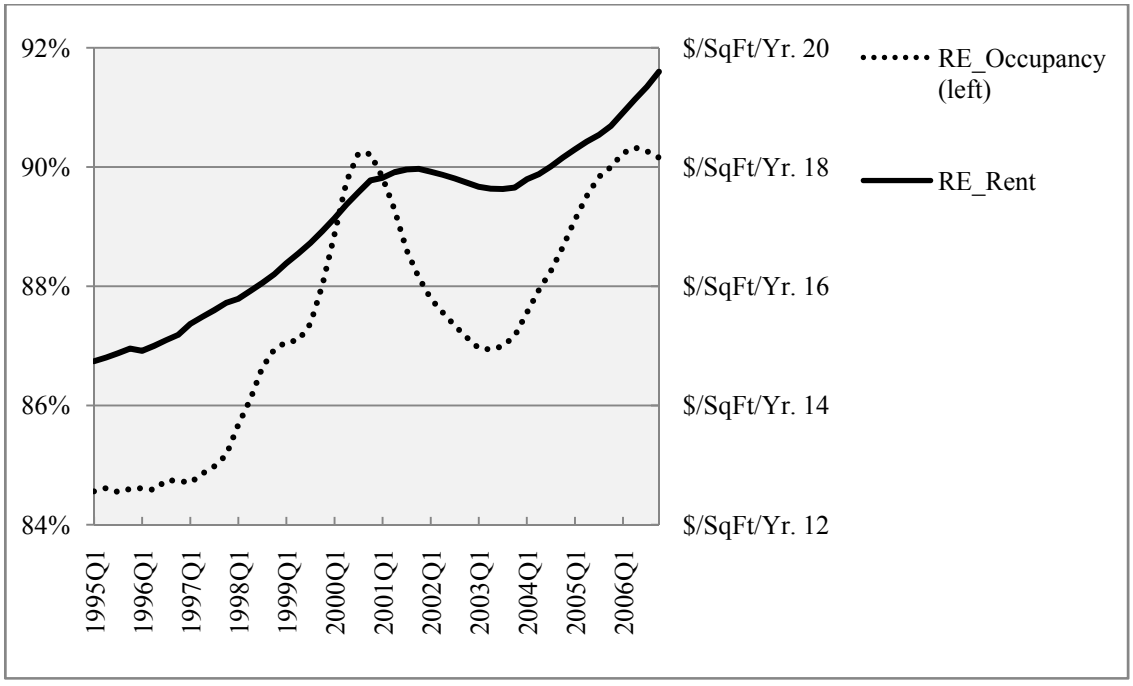
Link 3: Occupancy Levels with Rent Levels

Having analyzed the links between "growth rates," the following link shows the relationship between rent levels and occupancy levels. As shown in the illustration below, the two time series appear to have the same dynamics in terms of market cycles.

This is not the case for every sector, as can be concluded from Table 44 at the beginning of the chapter.

Taking into consideration the characteristics of retail real estate as the assets underlying these cyclical movements, in particular the duration and structure of rental contracts for retailers in shopping centers and regional malls, it appears to be obvious that Retail Real Estate Investment Trusts benefit immediately from changing economic fundamentals in terms of occupancy and rent levels in the same quarter as shown below.

Figure 120: Occupancy and Rent Levels – Retail REIT Sector



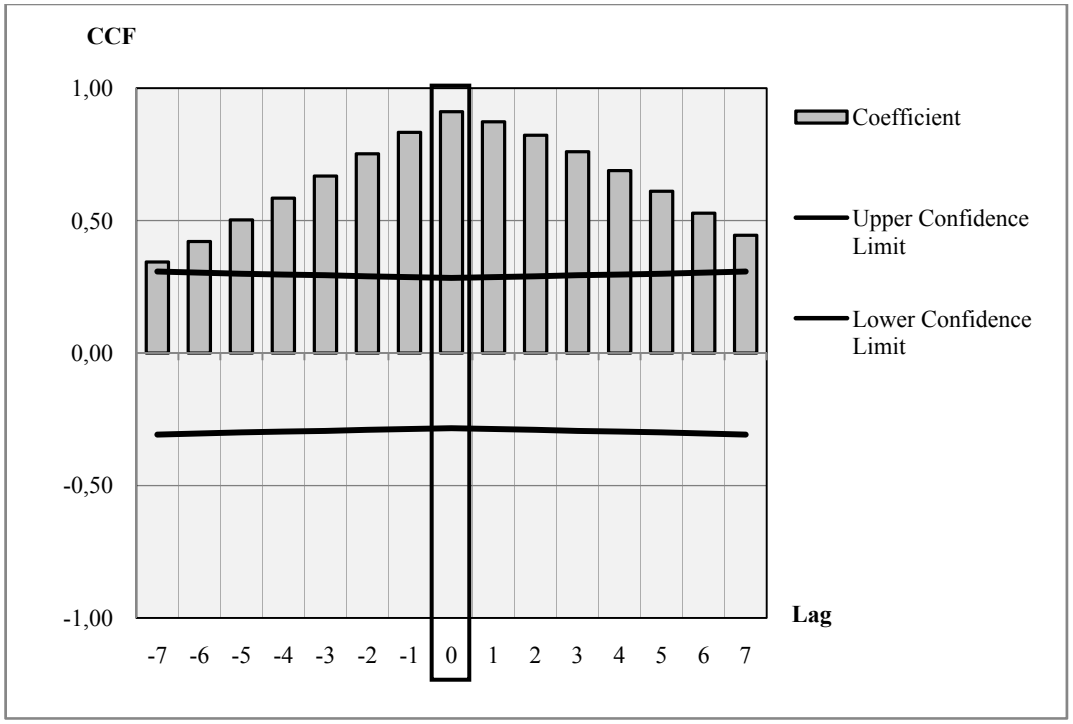
Source: SNL REAL ESTATE, PFEFFER.

Figure 121 confirms that there is no lag between rent and occupancy levels for the Retail REIT sector. This is not in contrast to the findings in terms of growth rates because high rental growth rates do not necessarily coincide with the highest rent levels, as described in the next paragraph.

As shown in the diagram below, the correlation between the two factors is nearly perfect for the Retail sector. Since rents are often tied to the sales of the tenant, Retail REITs can more easily increase their rents if there is higher demand for occupancy space triggered by improved economic fundamentals that are in favor of retail.[312]

[312] Cf. BENJAMIN, J.D. (1994), no page.

Figure 121: Lags and Association Rent with Occupancy Levels



Source: SNL REAL ESTATE, PFEFFER.

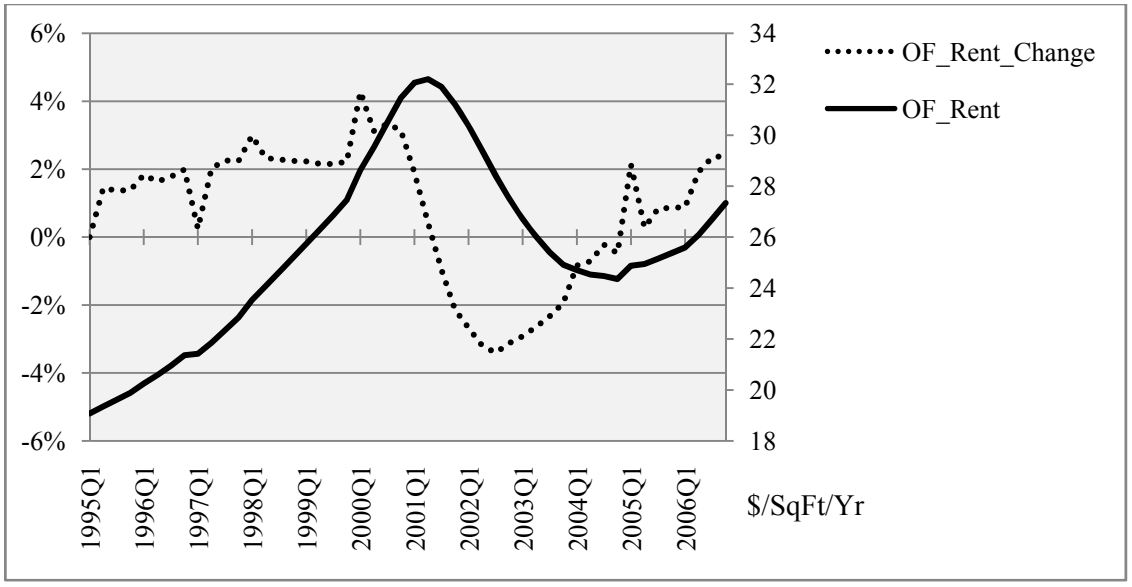
Figure 122 shows that rent levels peak when rental growth rates change from positive to negative, as shown in the diagram below. Rental growth rates are zero when rent levels reach their peak at $32 in 2001:Q1. Moreover, rental growth rates started increasing again in 2002:Q3, when rent *levels* were still decreasing.

Therefore, it is important to track and differentiate between turning points of rental growth rates (decreasing versus increasing and vice versa) on the one hand and changes of sign of rental growth rates (positive to negative and vice versa).

In contrast, rent levels increased in 2004:Q4 when rental growth rates changed from negative to positive again. This illustrates the necessity of differentiating between growth rates and the variables themselves in terms of space market factors. Also, this implies different consequences for growth rates as earlier indicators of changes in the space market conditions.[313] As a consequence, investors should consider or track turning points in growth rates as an earlier signal for changing conditions in the specific space markets.

[313] Refer to chapter 4.3, p. 132.

Figure 122: Rent_Change with Rent Levels – Office REIT Sector



Source: SNL REAL ESTATE, PFEFFER.

4.6.1.2 Company-level Results for Space Market Factors

Based on the findings for REIT companies as summarized in Table 45, the time lags are similar to the sector-level results. Nonetheless, the time lags are not always exactly the same and can differ from plus/minus one or two quarters from the sector-level results. Except for that, the time lags are in line with the findings. Nevertheless, the analysis did not always find significant results for all companies but for the majority of all REITs investigated. Despite the range in terms of time lags for certain links and companies within a REIT property sector, certain links such as numbers 1 and 2 for Office REIT companies are exactly the same. Similarly, link 3 (occupancy with rent levels) is always zero (no time lags) for all REIT companies excluding Office REITs.

Table 45: Quarterly Lags and Association Space Market Factor REITs – Company Level

A: Occupancy (Change) with Rent (Change)	Office	Industrial	Retail	Apartm.	Hotel
1 OCCUP_CHANGE wiH RENT_CHAN:	Lag 4	Lag 0-4	Lag 2-3	Lag 0-4	Lag -1-0
2 RENT_CHANGE with OCCUPANCY	Lag 2	Lag 1-2	Lag 0-4	Lag 0-3	Lag 2-3
3 OCCUPANCY with RENT	Lag 4-8	Lag 0	Lag 0	Lag 0	Lag 0

Source: SNL REAL ESTATE, PFEFFER.

Since the sector-level analysis has already shown and reasoned why occupancy changes are likely to lead rental growth rates, the findings for link 1 are justifiable. In addition,

the results for the Hotel REITs company sample confirm the findings of the sector level in terms of rental growth rates leading occupancy changes as well as being the sector with the shortest time lags. Also, Industrial REITs seem to have more or less the same dynamics as Apartment REITs.

In analyzing link 2, the results suggest that high rental growth rates in one quarter are reflected in high occupancy levels, demonstrating the signaling function of rental growth rates for occupancy levels. Thus, the range of the time lags can be relatively high for Retail and Apartment REITs. This may be caused by the different rental contract schemes of REIT companies within these sectors. Also, these lags are quarterly lags only, which may be caused by differences in property subtypes in particular for shopping centers and regional malls for retail real estate.

When interpreting the results for link 3, it seems logical that occupancy and rent levels increase at the same time if there is increased demand for space caused, for example, by an increase in gross domestic product and/or other macroeconomic factors. The occupancy levels lead the rent levels of REITs because of the long-term contracts tenants of Office REITs are subject to.

4.6.2 Space Market Factors with Funds from Operation

Having analyzed the associations and time lags between the space market cycle parameters, the following section deals with the relationship between the underlying space market cycles of REITs and the profitability of REITs measured by Funds from Operation and change in FFO. The analysis of FFO and FFO change has a different meaning.

While a high FFO per share/quarter indicates that the REIT sector has achieved a high operation performance, the analysis of the association of space market cycles and FFO change has a different focus. In this light, the question whether – and if yes, after how many time lags – there is a link between rental growth rates/occupancy changes and FFO change is of particular interest for REIT investors and analysts.

4.6.2.1 Space Market Factors with Funds from Operation – Sector-level Results

Based on the finding shown in the summary below, the analysis finds significant links between space market factors and FFO. In this light, there are significant links between space market growth rates and FFO change. The only sector where the study does not find significant links is for the Retail REIT sector. This might be caused by the space market data the analysis is based on, which does not differentiate between property subtypes such as regional malls, shopping centers, and other retail types such as outlet centers. This complicates the analysis of space market factors and FFO.

The analysis finds numerous significant links. For example, the study finds that there are lags of three and six quarters between changes in the space market cycles of Office REITs and a change in FFO. The same seems to hold true for the Apartment REIT sector, with shorter time lags of two and four quarter lags. For the Hotel and Industrial REIT sectors, rental growth rates are reflected in a positive FFO change in the same quarter. In summary, changes in occupancy are an earlier indicator of a change in FFO. This is in line with the findings of the dynamics between rental growth rates and change in occupancy presented in the preceding section.

Table 46: Quarterly Lags and Association Space Market Factors with FFO – Sector Level

B: Space Market with FFO	Office	Industrial	Retail	Apartm.	Hotel
1 RENT_Change → FFO_Change	Lag 3	Lag 0	Not sign.	Lag 2	Lag 0
2 OCCUP_Change → FFO_Change	Lag 6	Lag 5	Not sign.	Lag 4	Not sign.
3 RENT → FFO	Lag 0	Lag 0	Lag 0	Lag 0	Lag 0
4 OCCUP → FFO	Lag 12	Not sign.	Lag 0	Lag 8	Lag 0

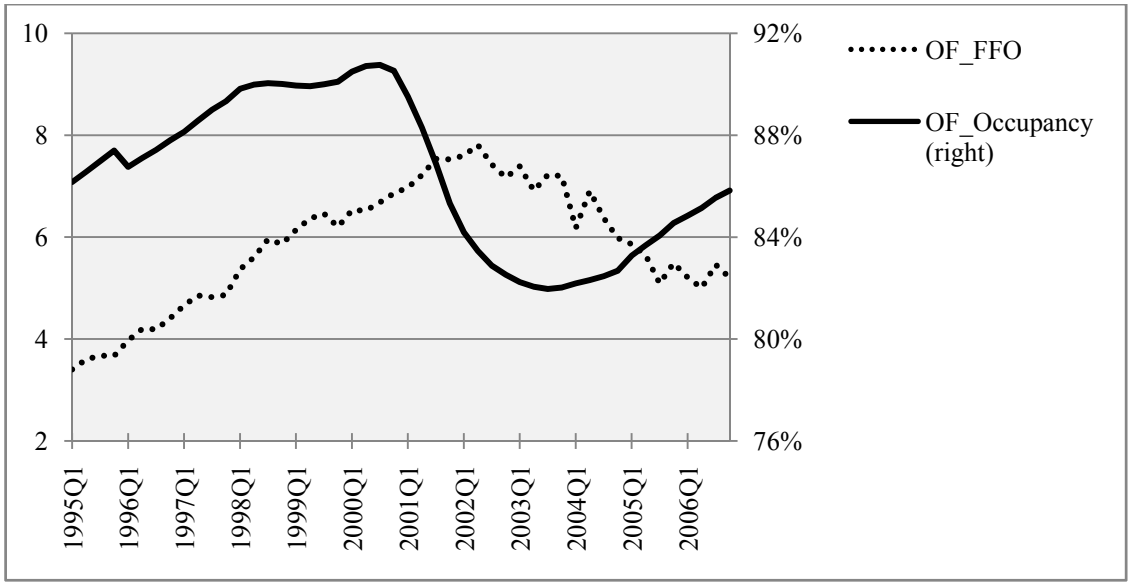
Note: All the links above are significant at a 5% level.

Source: SNL REAL ESTATE, PFEFFER.

Turning to the links between rent and occupancy *levels* and FFO, the evidence shows that high rents are normally reflected in a high FFO in the same quarter. This holds true for all five REIT property sectors. This suggests that REITs are able to capitalize on increasing rents in the underlying space markets immediately. Since Retail REITs often charge a base rent and a variable rental rate that depends on the turnover of the corresponding retailer, the coefficient is extremely high at a time lag of zero. As a logical consequence, the operating performance in terms of FFO of a REIT is linked directly to the base rent and the sales of the tenants. Interestingly, this also holds true for

high occupancy in the underlying space markets and FFO for Retail and Hotel REITs but not for Apartment and Office REITs. Looking at the occupancy cycle of Office REITs as shown in Figure 123, the diagram shows the dynamics of FFO and how it relates to occupancy. Since Office REITs have long rental contracts compared to the other sectors, the Office REIT sector was able to keep FFO up for a relatively long period of time, after occupancy levels dropped significantly in 2000:Q3. On the other hand, FFO was still decreasing when occupancy levels bottomed out in 2003:Q3 and started to increase again.

Figure 123: Occupancy Cycle versus FFO of Office REITs – Sector Level



Source: SNL REAL ESTATE, PFEFFER.

In summary, the results show that it takes a considerable amount of time until the high occupancy in office real estate in the space markets is reflected in a high operating performance after three years. This shows that occupancy and rent levels have a different signaling function for forecasting FFO with sector-specific differences. In summary, this stresses the importance of space market analysis to forecast operating performance in terms of FFO for REITs.

4.6.2.2 Space Market Factors with Funds from Operation – Company-level Results

In total, the sector-level analysis has found stronger links between space markets factors and FFO than for the company-level analysis. Since the sector-level analysis includes more than 95% of REITs, idiosyncratic or company-specific factors are less likely to

bias the fundamental link between space market factors and FFO. Also, Table 47 illustrates that there are weaker links between the *growth rates* and FFO change than between rent/occupancy *levels* and FFO.

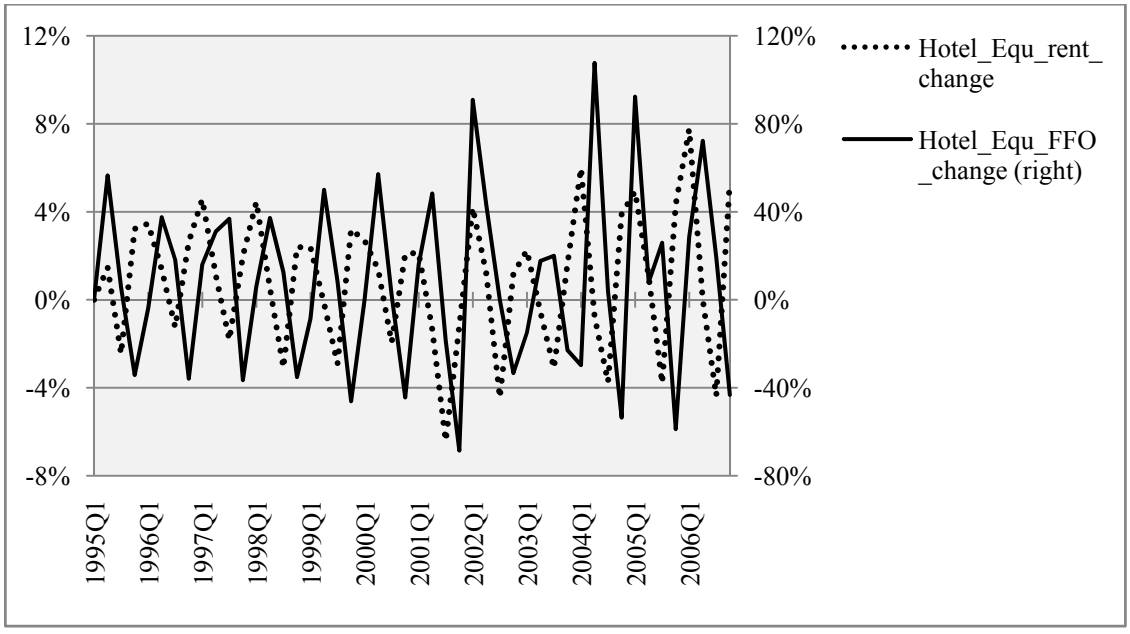
Table 47: Quarterly Lags and Association Space Market Factors with FFO – Company Level

Space Markets with FFO	Office	Industrial	Retail	Apartm.	Hotel
5 RENT_Change → FFO Change	Lag 6-8	Not sign.	Not sign.	Not sign.	Lag 2
6 OCCUP_change → FFO_Change	Not sign.	Not sign.	Lag 0-1	Not sign.	Lag 0
7 RENT → FFO	Lag 0	Lag 0	Lag 0-1	Lag 0	Lag 0-1
8 Occupancy → FFO	Lag 4-7	Not sign.	Lag 0-3	Lag 0-6	Lag 0

Source: SNL REAL ESTATE, PFEFFER. Note: Quarterly, significant (at 5%-level) lags.

Similar to the sector-level analysis, occupancy is an earlier indicator for FFO than rent levels in the space market cycle of an individual REIT. Similar to REIT sectors, high rent levels are reflected in the high FFO of REITs. Also, Office and Apartment REITs can have a long time lag between occupancy and FFO. This includes high occupancy levels and high FFO, similar to low occupancy levels and low FFO.

Figure 124: Rent Change with FFO Change – Equity Inns Hotel REIT



Source: SNL REAL ESTATE, PFEFFER.

Moreover, the analysis finds that rent changes are likely to be reflected in an FFO change after two quarters for the Hotel REITs in the sample. Although not easily observable from the diagram below, it was demonstrated that, first, rental growth rates

and FFO change are closely related and, second, that there is a lag between the two time series. In addition, the diagram illustrates that the space market cycles of Hotel REITs are more volatile than the other four sectors due to the seasonal component as one important factor.

4.6.3 Space Markets with FFO Multiples – Sector- and Company-level Results

As shown in the table below, there is no significant evidence for the existence of significant links between individual space market factors and different pricing factors. Neither for FFO multiples nor for stock price change, the analysis finds a signaling function of individual space market factors and pricing measures. Except for the few significant links found between occupancy changes and FFO multiples for the Office and Apartment REIT sectors, there are no significant bivariate links.

Table 48: Quarterly Lags and Association Space Market Factors with Pricing – Sector Level

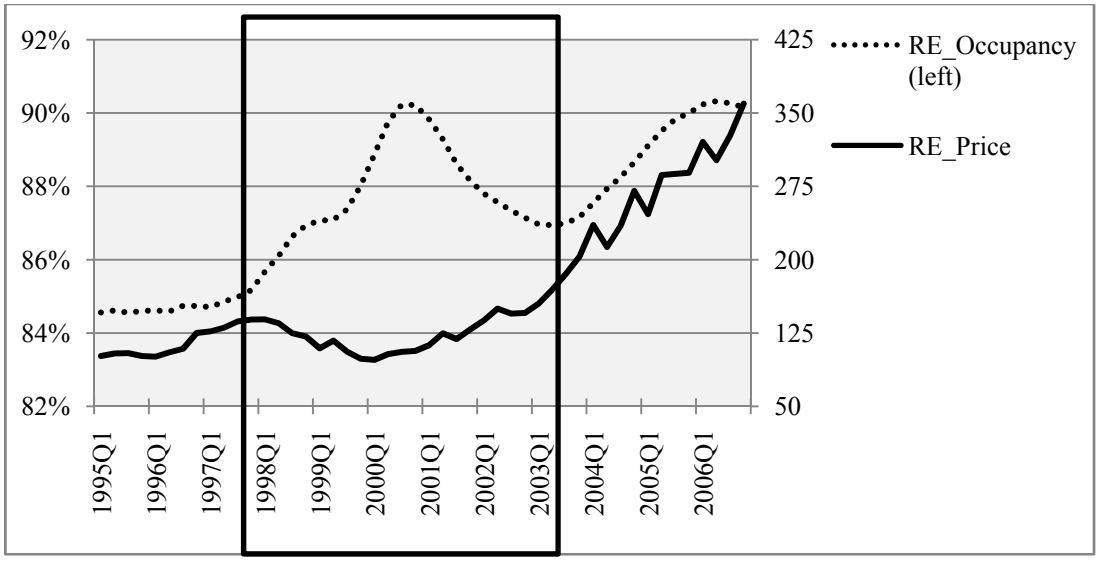
C: Space Markets with Pricing of REITs	Office	Industrial	Retail	Apartment	Hotel
1 RENT Change → Multiple					
2 RENTChange → Multiple Change					
3 OCCUP Change → Multiple	Lag 2			Lag 2	
4 OCCUP Change → Multiple Change					
5 RENT Change → Stock Price Change					
6 OCCUP Change → Stock Price Change					

Source: SNL REAL ESTATE, PFEFFER. Note: Quarterly, significant (at 5%-level) lags.

Analyzing the link, for example, between the occupancy of Retail REITs and the Retail REIT stock price index, Figure 125 shows that occupancy and stock price were moving into the same direction until 1997:Q4 when occupancy rates started increasing significantly while the stock price was weakening. Then, after occupancy rates peaked in 2000:Q3 and were decreasing, the stock price index started increasing.

Thus, stock price and occupancy started moving again in the same direction after 2004:Q1. In total, the chart illustrates the irrationality in terms of the pricing of REITs by their underlying space market development more than half of the time during the period of the investigation (marked with the box).

Figure 125: Retail REIT Occupancy with Retail REIT Stock Price Index



Source: SNL REAL ESTATE, PFEFFER.

Similar to the sector-level results, the company-level analysis does not find significant results with two exceptions: occupancy with stock price for different Hotel REITs (lag: two quarters) and rents with multiples for various Apartment REITs (lag: 0 to 1). The example of the Supertel Hospitality REIT below is representative of most Hotel REITs in the sample showing a time lag of two quarters between the occupancy levels of the REIT and the stock price index. As illustrated, the occupancy and stock price series are closely related to the occupancy cycle leading the stock price index. Except for this link, the CCF/lag analysis finds no significant results on the company level.

4.6.4 Funds from Operation with Pricing – Sector- and Company-level Results

Sector Level

As demonstrated in Table 49, the analysis does not find any significant links between the operating performance of REITs and the pricing of REITs. This includes the relative pricing of REITs by FFO multiples as well as in terms of stock price changes. Taking into consideration that capital flows are determined to a large degree by investor sentiment, the results suggest that the pricing of REITs is not determined by the underlying earnings development. This by itself is an important finding.

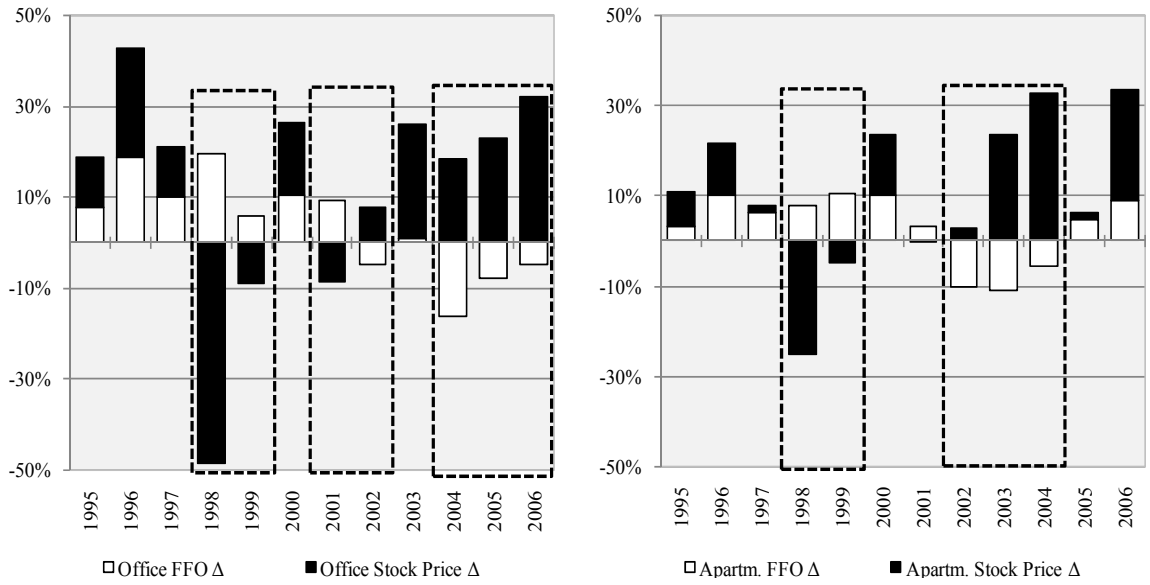
Table 49: Lags and Association FFO with Pricing – Sector Level

D: FFO with FFO multiple/Price Change	Office	Industrial	Retail	Apartment	Hotel
1 FFO → Multiple			T1		
2 FFO → Multiple Change					
3 FFO Change → Multiple					
4 FFO Change → Multiple Change					
5 FFO → Stock Price-Chang					
6 FFO Change → Stock Price Change					

Source: SNL REAL ESTATE, PFEFFER. Note: Quarterly, significant (at 5%-level) lags.

Analyzing the pricing and FFO (change), the diagram below highlights the years during which the pricing of REITs (in this case for Apartment and Office REITs) did not follow their earnings development. As shown, the "periods of irrationality" represent more than half of the whole study period. Also, the periods during which pricing went into the contrary direction of FFO changes vary among sectors. Moreover, during the years that the stock price change was relatively high in one direction, the FFO change was also very high (or vice versa) in the opposite direction, for example, 1998, 2004 for Office or 1998 for the Apartment REIT sector.

Figure 126: Irrationality of Pricing – Office and Apartment REIT Sectors



Source: SNL REAL ESTATE, PFEFFER.

Besides the fact that REIT property sectors differ in terms of the volatility of earnings and pricing (Office REITs are more volatile than Apartment REITs) the periods of irrationality are not always the same. For example, all Equity REIT sectors were

negatively affected in terms of stock price changes by the New Economy Boom of the years 1998/99 ("love new economy, hate old economy stocks") but not by the 9/11 attacks of the year 2001, which impacted Office REIT stock prices to a different extent than Apartment REIT stock prices.

Company Level

Similar to the sector-level results, the results as pictured in the table below do not suggest that there is a forecasting ability or signaling functions of FFO or FFO Change for the pricing of REITs in terms of FFO multiples or stock price changes. Only for the Retail REITs does the analysis sometimes find little evidence for links and time lags between FFO (change) and FFO multiples and stock price change. Also, there is little evidence that FFO is reflected in a stock price change for the Apartment REIT companies. To conclude, there is strong evidence that there is no significant link between the earnings of a REIT or a REIT sector and its pricing in the stock market.

Table 50: Lags and Association FFO with Pricing – Company Level

D: FFO with FFO multiple (Change)	Office	Industrial	Retail	Apartment	Hotel
1 FFO → Multiple			1 to 2		
2 FFO → Multiple Change					
3 FFO_Change → Multiple					
4 FFO_Change → Multiple_Change					
5 FFO → Stock Price-Chang			1	0 to 1	
6 FFO_Change → Stock Price_Change					

Source: SNL REAL ESTATE, PFEFFER. Note: Quarterly, significant (at 5%-level) lags.

4.6.5 Section Summary

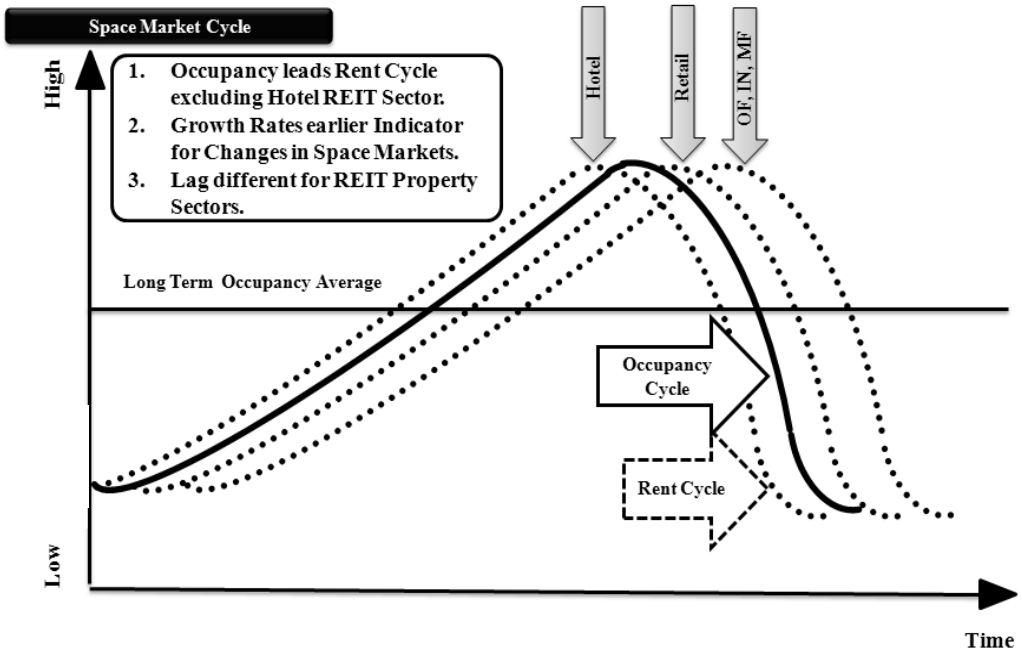
The analysis of time lags has brought several insights that are important for the following analysis as well as for the understanding of space market factors of REITs.

- Time lags between sectors differ significantly. For example, in terms of the link between occupancy change and rental growth rates, the Office, Industrial, and Apartment REIT sectors have the longest time lag (+4 quarters), Retail REITs a short time lag (+2 quarters), and in the case of the Hotel REIT sector,

rental growth rates lead occupancy change be one quarter (-1 Quarter) as shown in Figure 127 below.

- Growth rates are an earlier indicator for changing space market conditions than absolute occupancy and rent levels. As shown in Figure 122, the turning point of rental growth rates (increasing to decreasing) occurs before the turning point in terms of rents (increasing to decreasing). This is due to the fact that although rental growth rates are decreasing they are still positive. As a consequence, rent levels do not decrease till rental growth rates are negative.
- Time lags on a company level are in line with the sector-level findings but not always exactly. Typically, time lags are clustered around the sector-level findings plus/minus one or two quarters. Nonetheless, the explanatory power of the company-level-based analysis is less strong, meaning that the lags found on the sector level cannot be confirmed for all REITs on the company level. One possible explanation is the idiosyncratic factor effective on a company level.
- Occupancy growth rates change earlier than rental growth rates (for most sectors). This appears to be logical because rental rates are often fixed by rental contracts over a relatively long term, with certain adjustments specified in the contract. If there is additional demand for space, space can be rented out immediately under the condition that the building is not fully occupied and tenant improvements have been performed.
- There clearly is a forecasting ability of rent and occupancy factors for FFO (on an absolute levels as well as for growth rates).
- The longest lag between space market factors and FFO can be found for office real estate (it is important to note that the space market factors here are not the actual rents but the theoretical rents based on the exposure).
- There is no evidence of a significant link between space market factors and earnings on the one hand and pricing on the other hand.
- Moreover, there is no evidence of a significant link between the earnings of REITs and the pricing of REITs.
- Also, there is no evidence of reverse links, meaning that FFO leads space market performance or the endogen relationships between these factors.

Figure 127: Ideal Type of Relationship Occupancy and Rent Cycles of REITs



Source: Own illustration.

To summarize, the results of the analysis for the space market factors, occupancy change, and rental growth rates appear to have an important signaling function because they are the so-called lead variables. Also, the forecasting potential of these factors for FFO (change) and FFO multiple (change) has been demonstrated. Again, the results stress the necessity of a sector-specific analysis of each REIT property-type sector. Although there are differences within the sectors, the time lag between rental growth rates and occupancy typically ranges relatively closely from 0 to 2.

4.7 Regression Analysis of Space Market Cycles and Performance of REITs

In line with the research objective of the dissertation, the following chapter analyzes whether the (lagged) space market factors of REITs explain the earnings of REITs (Funds from Operation) on a firm level and whether the (lagged) space markets factors and/or (lagged) earnings of REITs explain the pricing of REITs in the stock market. Consequently, the regression analyses test two types of regression models with different predictors and dependent variables. Both have the form of a multifactor model with lagged predictors. Also, the analysis uses *growth rates,* not *levels,* such as rental or FFO growth rates, which has several advantages, such as comparability of REIT sectors and in order to account for spurious correlations.

As described in chapter 3.5, the multiple regression analysis uses the following steps to test the hypotheses based on the model specified:

1. Screening for Linearity/Correlation Analysis of Variables
2. Multivariate Analysis – Method: Enter (Different Models)
3. Multivariate Analysis – Method: Stepwise

under consideration and testing of premises (completeness of model, homoscedasticity, normal distribution and independence of residuals, collinearity).

Thus, the following sections focus on the results of the regression analysis separating REIT property sectors. The regression model includes the following groups of variables:

1. (Lagged) rent *change* and occupancy *change* factors of REITs (based on the results of the CCF-Analysis +/- one quarter separately for occupancy and rent change),
2. Control variables: Change in the three-month T-bill rate, Consumer Confidence, Housing Market Index, personal income, population, employment of nonfarm industries, consumer price index, and 10-year Treasury bond,
3. Change in REIT earnings or REIT pricing as the dependent variable,

to test whether the space market exposure can explain the earnings and/or pricing of REITs.

Research by NELSON/NELSON (2003); LEE/STEVENSON (2003); SU-JANE et al. (1998) has shown that these macroeconomic factors have an important predictive power for rents and vacancy as well as for the performance of REITs.[314] Since rents and occupancy levels of property types react differently to changes in the economic environment, as depicted by PING/ROULAC (2007); HARDIN III/CARR (2006); LEE/STEVENSON (2005b), a REIT property-type specific model is necessary.[315]

4.7.1 Regression Model Apartment REIT Sector

As shown in Table 51, space market fundamentals have a significant predictive power for the earnings of Apartment REITs measured by the change in Funds from Operation. In this way, the R square of the regression model accounts for around 50% of a REIT's Funds from Operation (Model 1). Also, the value of the Durbin-Watson test close to 2 demonstrates the low degree of autocorrelation. Because the analysis uses growth rates instead of the absolute levels of rents and occupancy, there is nearly no serial correlation.

As illustrated by the t-values, the rent change (lag two quarters) and the occupancy change (lag four quarters) in the space markets of an Apartment REIT's property portfolio have a significant predictive power for the earnings of REITs as expected. This is verified by Model 2, which explains approx. 45% of REIT FFO. Furthermore, the positive coefficients of the significant predictors illustrate that there is a *positive* relationship between the space market fundamentals of REITs and their earnings. Again, the space market factors shown here are not the *actual* rents and occupancy levels of REITs but the aggregate of the weighted occupancy and rent levels of REITs based on the exposure to the specified metro areas defined in this analysis in each of the 48 quarters during the study period.

Consequently, the findings imply that the development of space market fundamentals of Apartment REITs of the actual quarter has a very limited predictive power for the earnings of this quarter. Also, Models 3 and 4 indicate that the predictive power of the

[314] Cf. NELSON, T.R./NELSON, S.L. (2003); LEE, S./STEVENSON, S. (2003); SU-JANE, C., et al. (1998).

[315] Cf. PING, C./ROULAC, S.E. (2007); HARDIN III, W.G./CARR, J. (2006); LEE, S./STEVENSON, S. (2005b); Refer to Chapter 4, p. 136.

model can be increased further by including or analyzing the economic base of REIT sectors.

Table 51: Regression Models Apartment REIT Sector – 1995:Q1 – 2006:Q4

OLS	Model 1		Model 2		Model 3		Model 4	
Dep. AP_FFO_Change	Coeffic.	Sig.	Coeffic.	Sig.	Coeffic.	Sig.	Coeffic.	Sig.
Constant	-0,008	0,293	0,000	0,971	-0,035	0,292	-0,059	0,089
AP_Rent_Change	0,338	0,419					0,837	0.038**
AP_Rent_Change.1	0,264	0,535					0,389	0,316
AP_Rent_Change.2	0,916	0.037**	0,992	0.011**	0,946	0.072*	1,152	0.024**
AP_Rent_Change.3	0,289	0,551					0,129	0,782
AP_Occup_Change	1,495	0,510					-1,472	0,584
AP_Occup_Change.3	-1,896	0,577					-1,401	0,638
AP_Occup_Change.4	6,086	0,110	5,309	0.002***	4,851	0.072*	6,526	0.070*
AP_Occup_Change.5	-1,625	0,625					-6,026	0.052*
Control Variables	-		-		+		+	
R	0,702		0,670		0,796		0,874	
R^2	0,492		0,448		0,634		0,764	
Adjusted R^2	0,373		0,421		0,508		0,603	
N	43		44		44		43	
F / Sig.	4,122	0,002	16,665	0,000	5,032	0,000	4,755	0,000
Durbin-Watson	2,264		1,945		1,982		2,114	

*Note: All factors refer to the United States. All space market factors refer to the space market cycle of REITs. "AP" stands for apartment, Control Variables: "T-Bill" is the three-month T-bill rate, "ConsConf" is the change in Consumer Confidence, "HousMarkIndex" is the Housing Market Index, "PersInco" is the change in personal income, "Popu" is the change in population, "Empl" is the change in employment of nonfarm industries, CPI is the consumer price index, and "TreaBond" the change in the 10-year Treasury bond. Significance at a 5% (1%) significance level is highlighted with ** (***) and with * at a 10% level. ".1" stands for a lag of one quarter and so forth.*

Source: Own calculation.

As illustrated in Model 3, the R square and adjusted R square are higher. After testing Models 3 and 4 with a different method in terms of the inclusion of predictors, the results of the stepwise method suggest that two factors: AP_Occup_Change.4 (lag of four quarters) and Rent_Change.2 are the most important predictors. Also, population change was faund to be the most important of the control variables (not shown here). The finding that population change is extremely important in terms of macroeconomics is in line with the research by HE (2000); LIANG/CHATRATH/MCINTOSH (1996).[316] Nonetheless, the inclusion of lagged space market factors and their integration with

[316] Cf. HE, L.T. (2000); LIANG, Y./CHATRATH, A./MCINTOSH, W. (1996).

macroeconomic factors as well as the finding that lagged (not present) factors are important is new and contributes to a better understanding of the determinants of REIT profitability.

Table 52: Model Summary and ANOVA Apartment REIT Sector – Stepwise

Model Summary(c)

Model		R Square	Adj. R Square	Std. Error	Durbin-Watson
1	0,604	0,365	0,350		
2	0,715	0,511	0,487	0,020	2,184

a Predictors: (Constant), MF_occup_change.4
b Predictors: (Constant), MF_occup_change.4, Popu_Change
c Dependent Variable: MF_FFO_Change

ANOVA(c)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0,012	1	0,012	23,593	0,000
	Residual	0,020	41	0,000		
	Total	0,032	42			
2	Regression	0,016	2	0,008	20,918	0,000
	Residual	0,016	40	0,000		
	Total	0,032	42			

a Predictors: (Constant), MF_occup_change.4
b Predictors: (Constant), MF_occup_change.4, Popu_Change
c Dependent Variable: MF_FFO_Change

Source: Own calculation.

4.7.2 Regression Model Office REIT Sector

Based on the results of the regression analysis shown below, it can be said that not the present space market fundamentals (Office_Rent_Change and Office_Occupancy _Change of the present quarter) but the preceding quarters (precisely Office_Rent_Change.Lag3 Quarters and Office_Occup_Change.Lag6 Quarters) determine the earnings of REITs. Only these two quarters and OF_Occup_Change.7 have significant t-values, as shown below. These findings are in line with the lags found by the CCF/lag analysis presented in section 4.6.2.1. Consequently, investors should consider these quarters when forecasting Funds from Operation from REITs.

Nonetheless, the predictive power of space market factors is limited as illustrated by the results of the regression Models 2 and 3 where none of the space market factors has a significant t-value. In contrast to the regression models of the other REIT property

sectors, the model does not find evidence of a significant predictive power of the control variables for FFO change (not shown individually). Nevertheless, the positive coefficients of OF_Rent_Change.3 and OF_Occup_Change.6 as the significant variables in Model 1 are reasonable, expressing that an improvement in the underlying space markets has a positive effect on the earnings of REITs.

Table 53: Regression Model Office REIT Sector – 1995:Q1 to 2006:Q4

OLS	Model 1		Model 2		Model 3		Model 4	
Dep. OF_FFO_Change	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**
Constant	-0,005	0,646	0,000	0,975	-0,008	0,938	-0,080	0,464
OF_Rent_Change	0,130	0,927					0,623	0,727
OF_Rent_Change.2	-2,000	0,162					-2,739	0,129
OF_Rent_Change.3	3,574	0.011**	0,979	0,113	0,701	0,412	3,451	0.053*
OF_Rent_Change.4	-0,179	0,884					-0,106	0,948
OF_Occup_Change	1,332	0,687					0,844	0,881
OF_Occup_Change.5	-3,713	0,176					-3,974	0,234
OF_Occup_Change.6	6,737	0.051*	0,180	0,930	0,787	0,783	8,011	0,081
OF_Occup_Change.7	-5,789	0.058*					-5,973	0,110
Control Variables	-		-		+		+	
R	0,569		0,395		0,477		0,633	
R^2	0,324		0,156		0,228		0,401	
Adjusted R^2	0,155		0,113		0,055		0,040	
N	41		42		42		41	
F / Sig.	1,914	0,092	3,608	0,036	0,805	0,634	7,293	0,01
Durbin-Watson	2,720		2,704		2.714		2,811	

*Note: All factors refer to the United States. All space market factors refer to the space market cycle of REITs. "OF" stands for office, Contral Variables: "T-Bill" is the three-month T-bill rate, "ConsConf" is the change in Consumer Confidence, "HousMarkIndex" is the Housing Market Index, "PersInco" is the change in personal income, "Popu" is the change in population, "Empl" is the change in employment of nonfarm industries, CPI is the consumer price index, and "TreaBond" the change in the 10-year Treasury bond. Significance at a 5% (1%) significance level is highlighted with ** (***) and with * at a 10% level. ".1" stands for a lag of one quarter and so forth.*

Source: Own calculation.

When analyzing the results of Model 4, where all factors are integrated, the p-values express that the most important determinant of FFO_Change is the rental growth rate (lag.3. This implies that investors should include this three-quarter time lag in their forecast of Office REIT earnings. Also, there is a positive relationship between the two factors (rent change and FFO change). Hence, a rent increase is reflected in a positive FFO change, which is rational. Also, the results of the stepwise method of inclusion of

predictors shows that rent change (lag three quarters) has the highest predictive power, as shown in the table below.

Table 54: Model Summary and ANOVA Office REIT Sector – Stepwise Method

Model	R Square	Adj. R Square	Std. Error	Durbin-Watson
1 0,397	0,158	0,136	0,052	2,632

a Predictors: (Constant), OF_Rent_change.3
b Dependent Variable: OF_FFO_Change

ANOVA(b)

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	0,019	1	0,019	7,293	0,010
Residual	0,104	39	0,003		
Total	0,123	40			

a Predictors: (Constant), OF_Rent_change.3
b Dependent Variable: OF_FFO_Change

Source: Own calculation.

Although the regression model has been applied to stock price change as the dependent variable instead of OF_FFO_Change, the findings suggest that there is an irrational relationship between space market fundamentals and the pricing of REITs in the capital markets (for all REIT property type sectors). “Irrational” refers to the fact that the significant coefficients suggest that there is a negative link between space market fundamentals and the pricing of REITs. Therefore, the results focus on the link between space market factors and FFO (not pricing of REITs).

4.7.3 Regression Model Retail REIT Sector

Compared to the other REIT property sectors, the explanatory power of the regression model is lower, as expressed by the smaller values of R square and adjusted R square. As shown in Model 3, occupancy change (lag three quarters) is the most important predictor from the space market factors. In this way, an increase in occupancy in the space markets of a Retail REIT, for example, in quarter one, is reflected in an increase in earnings three quarters later.

In this context, the smaller explanatory power of the regression model for Retail REITs may be due to the fact that different relatively diverse retail property subtypes are commingled under Retail REITs (shopping centers, regional malls, and retail other).

This is in line with the findings of KLAMER/GORTER/NIJKAMP (2001); MYER/WEBB (1994b), who illustrated the characteristics of Retail REITs and retail properties.

In contrast to the preceding REIT property-type sectors, the Retail REIT sector is the first sector where the present rent change (no time lag in quarters) is a significant predictor in Model 1. Nonetheless, Models 3 and 4 show that this predictor is not significant anymore when macroeconomic factors are included. Therefore, the results are limited due to the limited statistical significance.

Table 55: Regression Model Retail REIT Sector – 1995:Q1 – 2006:Q4

OLS	Model 1		Model 2		Model 3		Model 4	
Dep. RE_FFO_Change	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**
Constant	0,042	0,062	0,046	0,019	0,175	0,171	0,212	0,121
RE_Rent_Change	-11,645	0,016**	-6,363	0.039**	-8,960	0.068*	-8,600	0,183
RE_Rent_Change.1	6,802	0,207					6,651	0,305
RE_Rent_Change.2	2,311	0,655					2,598	0,639
RE_Rent_Change.3	-3,793	0,377					-6,603	0,204
RE_Occup_Change	6,129	0,440					5,556	0,601
RE_Occup_Change.1	1,823	0,877					1,728	0,901
RE_Occup_Change.2	-9,471	0,417					-11,080	0,387
RE_Occup_Change.3	12,893	0,128	8,653	0.038**	9,140	0.060*	14,038	0,146
Control Variables	-		-		+		+	
R	0,499		0,340		0,557		0,644	
R^2	0,249		0,115		0,310		0,414	
Adjusted R^2	0,082		0,730		0,800		0,045	
N	45		45		45		45	
F / Sig.	1,49	0,195	2,74	0,076	1,349	0,243	1,123	0,383
Durbin-Watson	2,460		2,535		2,664		2,437	

*Note: All factors refer to the United States. All space market factors refer to the space market cycle of REITs. "RE" stands for retail, Control Variables"T-Bill" is the three-month T-bill rate, "ConsConf" is the change in Consumer Confidence, "HousMarkIndex" is the Housing Market Index, "PersInco" is the change in personal income, "Popu" is the change in population, "Empl" is the change in employment of nonfarm industries, CPI is the consumer price index, and "TreaBond" the change in the 10-year Treasury bond. Significance at a 5% (1%) significance level is highlighted with ** (***) and with * at a 10% level. ".1" stands for a lag of one quarter and so forth.*

Source: Own calculation.

4.7.4 Regression Model Hotel REIT Sector

Based on the results of the regression model, it can be stated that a rent change of the preceding quarters in the space markets a Hotel REIT is invested in has the highest

predictive power for Funds from Operation. This means that investors and analysts should use the space market data of this quarter (in particular, room rates of hotels) to predict Funds from Operation.

Interestingly, the regression analysis suggests that consumer confidence (one of the control variables) is the most significant predictor of the earnings of REITs other than space market factors. As demonstrated by the coefficient, the higher consumer confidence, the higher the earnings of Hotel REITs. Furthermore, the results imply that there is a positive relationship between a change in the CPI and the earnings of REITs. In contrast, the Treasury bond rate has a negative impact on the FFO of Hotel REITs.[317]

Table 56: Regression Model Hotel REIT Sector – 1995:Q1 – 2006:Q4

OLS	Model 1		Model 2		Model 3		Model 4	
Dep. HO_FFO_Change	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**
Constant	0,022	0,640	0,005	0,888	-0,407	0,247	-0,665	0,278
HO_Rent_Change	-0,624	0,667					-2,002	0,253
HO_Rent_Change.1	2,641	0.07*	2,718	0.024**	0,619	0,661	-0,834	0,685
HO_Rent_Change.2	0,376	0,790					-2,689	0,307
HO_Rent_Change.3	-1,730	0,227					-2,716	0,173
HO_Occup_Change	7,561	0,301					8,946	0,349
HO_Occup_Change.1	-2,224	0,837					0,878	0,936
HO_Occup_Change.2	-12,687	0,243					-11,407	0,282
HO_Occup_Change.3	11,172	0,131					13,539	0.089*
Control Variables	-		-		+		+	
R	0,469		0,328		0,643		0,711	
R^2	0,220		0,108		0,413		0,506	
Adjusted R^2	0,047		0,088		0,250		0,195	
N	45		47		47		45	
F	1,269	0,29	5,428	0,024	2,537		1,627	
Durbin-Watson	3,028		2,807		2,394		2,301	

*Note: All factors refer to the United States. All space market factors refer to the space market cycle of REITs. "HO" stands for hotel, Control Variables: "T-Bill" is the three-month T-bill rate, "ConsConf" is the change in Consumer Confidence, "HousMarkIndex" is the Housing Market Index, "PersInco" is the change in personal income, "Popu" is the change in population, "Empl" is the change in employment of nonfarm industries, CPI is the consumer price index, and "TreaBond" the change in the 10-year Treasury bond. Significance at a 5% (1%) significance level is highlighted with ** (***) and with * at a 10% level. ".1" stands for a lag of one quarter and so forth.*

As shown in the table below, Model 4, which incorporates all factors, can explain around 50% of REITs' performances in terms of their earnings (R square). Also, the

[317] The diagram only shows the control variables aggregated not individually because the analysis focuses on the space market factors.

analysis of the quarterly space market data of REITs − as shown in Model 1− accounts for approx. 22% by means of R square. In summary, there is a predictive power of a fundamental analysis of REITs, in particular by their space market characteristics and economic base. Also, there is a need for sector-specific analysis because the significant space market factors differ and the economic indicators differ in their importance. Nonetheless, the t-values of the space market factors are less significant in Models 3 and 4 compared to Models 1 and 2.

4.7.5 Regression Model Industrial REIT Sector

In contrast to the other sectors, the regression analysis has not found significant predictors in terms of space market factors, either for rent or for occupancy change. The analysis included factors from a lag of zero quarters to up to 14 quarters for both variables (rent and occupancy change). The results suggest that none of these factors has a significant predictive power. This situation may be due to the fact that the Industrial REIT sector is the only sector with significant foreign property holdings, which might bias the results.

Table 57: Regression Model Industrial REIT Sector – 1995:Q1 – 2006:Q4

OLS	Model 1		Model 2		Model 3		Model 4	
Dep. IN_FFO_Change	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**	**Coeffic.**	**Sig.**
Constant	0,017	0,147					-0,048	0,544
IN_Rent_Change	1,256	0,222						
IN_Rent_Change.1	0,147	0,884						
IN_Rent_Change.2	-1,544	0,135						
IN_Rent_Change.3	0,992	0,299						
IN_Occup_Change	0,574	0,884						
IN_Occup_Change.4	-6,977	0,404						
IN_Occup_Change.5	7,789	0,463						
IN_Occup_Change.6	2,149	0,769						
Control Variables	-		-		+		+	
R	0,459						0,513	
R^2	0,211						0,263	
Adjusted R^2	0,019						0,089	
N	42						48	
F / Sig.								
Durbin-Watson	2,807						2,852	

Note: All factors refer to the United States. All space market factors refer to the space market cycle of REITs. "IN" stands for industrial, Control Variables: "T-Bill" is the three-month T-bill rate, "ConsConf" is the change in Consumer Confidence, "HousMarkIndex" is the Housing Market Index, "PersInco" is the change in personal income, "Popu" is the change in population, "Empl" is the change

*in employment of nonfarm industries, CPI is the consumer price index, and "TreaBond" the change in the 10-year Treasury bond. Significance at a 5% (1%) significance level is highlighted with ** (***) and with * at a 10% level. ".1" stands for a lag of one quarter and so forth.*

Source: Own calculation.

Looking at the importance or significance of the macroeconomic factors, only one factor − consumer confidence − seems to contribute to the explanatory power of this regression model. Therefore, other factors that are more specifically related to the industrial real estate segment such as imports and exports and so forth should be included in a future analysis. In addition, the explanatory power as expressed by the R square values is relatively low. Also, model 4 shows two significant economic parameters: a change in the consumer confidence and a change in the consumer price index.

.

4.7.6 Section Summary

In sum, the section has found that space market fundamentals have a significant power for the earnings of REITs as measured by FFO for most of the five sectors. In this way, the findings differ between REIT property types. The most important findings can be summarized as follows:

- Space market fundamentals have a predictive power for the explanation of REIT earnings.
- Occupancy Change is an earlier indicator of an earnings change of REITs.
- REIT property sectors have different space market predictors in terms of time lags for FFO change (".x" indicates the quarterly lag, e.g., Occup_Change.3 indicates that occupancy change leads FFO change by three quarters):
    - Apartment: Occup_change.4 Quarters Lag, Rent_Change.2 Quarters Lag
    - Office: Occup_Change.6 Quarter Lag, Rent_Change.3 Quarter Lag
    - Retail: Occup_Change.3 Quarters Lag
    - Hotel: Rent_change.1 Quarters Lag
    - Industrial: Not significant

- REIT property types have different economic predictors, such as population change for Apartment REITs and consumer confidence for Hotel REITs, that have a predictive power in addition to the space market fundamentals.
- The analysis finds significant results for four of the five sectors (not for Industrial REITs, where the earnings might be biased by significant foreign property holdings).
- The findings are in line with the results of the CCF /time-lag analysis.
- Space market fundamentals have a predictive power for the explanation of REIT pricing (stock price change), but the relationship is irrational, meaning that the coefficients are often negative. This means that in times of favorable space market conditions, investors have divested from REITs.

5 Discussion and Implications of Findings

Based on the findings, the chapter discusses the results and draws conclusions for each respective REIT property-type sector. A REIT property-type-specific discussion of the findings is necessary because the space markets dynamics, as well as the profitability and pricing of the respective REIT sectors, is significantly different, similar to the time lags. Furthermore, the chapter investigates the transferability to and implications for the emerging REIT industry in Europe. In this way, the corresponding REIT-Real Estate System of each REIT property-type sector integrates and summarizes the findings in terms of the following:

- Property Holdings and Investment Strategies of REITs
- Space Market Cycles of REITs
- Association and Time Lags between Space Market Cycles, the Earnings and Pricing of REITs
- Explanatory Power of Space Market Fundamentals of REITs

The REIT-Real Estate System presented in 2.2.2 forms the basis for the illustration of links and time lags between market cycle, earnings, and pricing factors.[318]

5.1 REIT-Real Estate System of Office Real Estate Investment Trusts

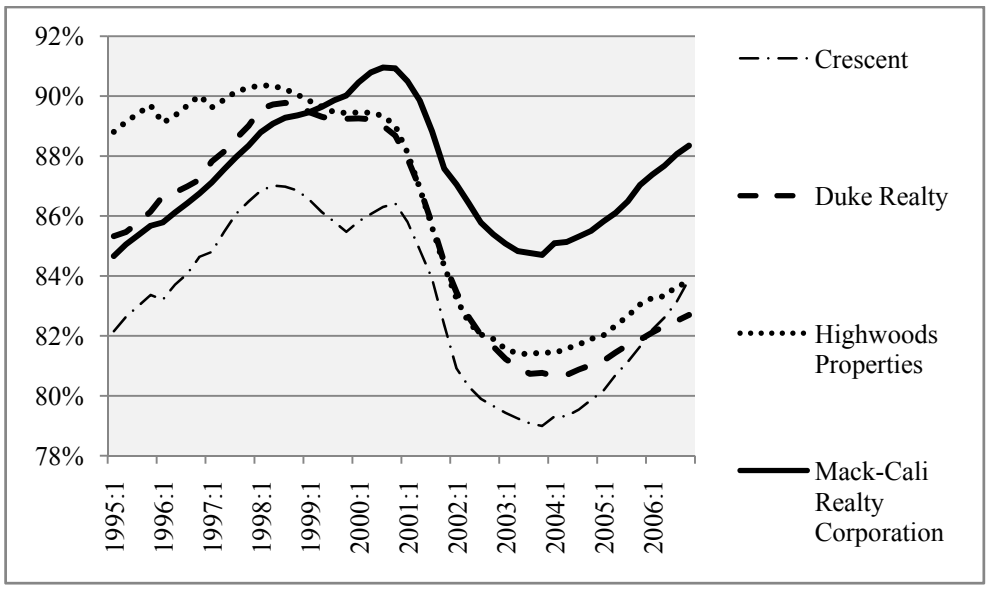
5.1.1 Investment Considerations for Office Real Estate Investment Trusts

Depending on the market exposure, investors in Office REITs should be aware of the regional exposure of the (REIT) property portfolio they invest in. The analysis has shown that not only REIT sectors but also the differences between the physical market cycles of Office REITs differ tremendously. Although all Office REITs follow an overall market trend, the space market cycles that determine the earnings potential of REITs differ, as shown below. In this way, investors should decide whether they prefer a REIT that is specialized, for example, in the North East such as Mack-Cali, or a diversified Office REIT. This is important because it affects the earnings potential of a REIT as demonstrated in the analysis as well as the risk/return profile. Consequently,

[318] Refer to Chapter 2.2.2, p. 32.

investors with higher return expectations who want to outperform the sector should invest in geographically focused REITs such as Mack-Cali Realty Corporation but not in geographically diversified companies such as Duke Realty.

Figure 128: Occupancy Levels by Market Selection of Office REIT Companies



Source: SNL REAL ESTATE, PFEFFER.

Due to the very cyclical nature of office real estate that is reflected in the operating performance, changes in the general economic climate or local space market conditions such as oversupply of office space, a reduction in demand for office space, or decreasing rental growth rates determine Office REIT profitability. On the other hand, office real estate is not seasonal, such as hotel real estate.[319] The analysis of time lags has shown that the time lag between a changing situation in the space markets and the operating performance on a REIT level is relatively long (up to three years). In this way, it will take a considerably long time until these changes are reflected in the FFO.

Also, the findings suggest that the capital markets do not price REITs according to their space market fundamentals approximately 50% of the time. Taking into consideration the large number of analysts tracking the performance of REITs in the United States, the pricing of public office real estate seems to be fairly inefficient in referring to the space market cycle of REITs based on the findings provided by empirical analysis. This implies that other factors such as "investor sentiment" determine the pricing of REITs.

[319] Refer to Chapter 4, p. 129 for an illustration why office real estate is more cyclical than industrial, retail or apartment real estate.

Moreover, the analysis has shown that – depending on the tenant base in different space markets – the market cycles of individual Office REITs differ. This means that some REITs such as Mack-Cali Realty and Maguire Properties, Inc., which have a regional focus (New York and New Jersey for the Mack-Cali Realty Corporation and California for Maguire Properties), also have a different tenant base related to the space markets they operate in. In terms of regional specialization, more than 75% of the Mack-Cali Realty Corporation's properties are in the New Jersey area, making the company vulnerable to a downturn in the securities, commodity, and contracts industry, and other financial and insurance industries; these are the two largest groups of tenants.[320] Maguire Properties, Inc.'s tenant base, on the other hand, depends to a greater extent on the legal industry (25% of the tenant base).[321]

Furthermore, the analysis of the companies proves that although Office REITs may differ in their average lease length, all companies share the same fundamental principles and time lags. This means that depending on the typical rent conditions and length in the respective markets and the local economic situation, the time lag between space market cycles and FFO can differ. For example, Maguire Properties, Inc. typically only structures leases of five or 10 years in the form of triple-net leases and modified gross leases.[322] Mack-Cali Realty states that 41% of its leases will expire in the next four years.[323] The remaining 59% expire in five years or later, whereby approximately 30% expire in or after 2017. This again contributes to the explanation of the large time lag between changes in the space markets and FFO of Office REITs.

From an investment management standpoint, the findings trigger the need to include market cycle analysis and the corresponding time lags between the different markets in the investment strategy. Taking into consideration the relatively long lease terms, the inclusion of space market cycles becomes more important for Office REITs. Understanding the dynamics of cross-correlations over time and the volatility of the stock markets contributes to better investment decisions. As shown in chapter 4.6.2, Office REITs were able to increase their earnings measured by FFO for three years although facing a sharp decline in rental and occupancy levels.

[320] Cf. MACK-CALI (2008), p. 35.
[321] Cf.MAGUIRE (2008), p. 31.
[322] Cf. Ibid., p. 31.
[323] Cf, MACK-CALI (2008), p. 31.

Also, the analysis of separate local markets demonstrates that volatile macro and micro factors exert a significant effect on the "physical market cycle of a REIT." Taking into consideration the long duration of (office) real estate cycles, management can try to mitigate the effects of a downturn in the office markets. Nevertheless, management cannot diminish the effects of external effects such as the 9/11 attacks. In this way, the work of DERMISI (2007); MILLER et al. (2003) has shown the effect of terrorism fears and events on office space in general as well as for different office building classes.[324]

5.1.2 Risk Factors of Office Real Estate Investment Trusts

In addition to the preceding section that highlights important investment considerations, the following aspects are important for the understanding of specific risk factors of Office REITs (list of examples, not exhaustive):

- **Regional and MSA Focus:** More than other REIT property types such as Hotel, Industrial, or Retail, Office REITs are often specialized on particular markets within one or two NCREIF regions. For example, Mack-Cali Realty Corporation focuses on the Northeast, in particular New Jersey, New York, and Pennsylvania. Therefore, a decline in the economy and office space in this particular region that depends to a large degree on financial institutions can affect the company's ability to make payments to its shareholders.
- **Potential Losses from Natural Disasters:** Certain REITs such as Maguire that focuses on (Southern) Californian markets are subject to substantial risk from natural disasters such as earthquakes. For example, six of Maguire's eight largest buildings that represent 45% of its annual rental income are in the Bunker Hill section of downtown Los Angeles. Since not all losses are and can be covered completely by insurance policies, an earthquake in downtown Los Angeles can seriously impact the company's ability to make dividend payments to its shareholders.[325]
- **Tenant Bankruptcies:** Tenant bankruptcies, for example, from the securities industry that represents 19,5% of Mack-Cali's annualized base rental revenue as

[324] Cf. DERMISI, S.V. (2007); MILLER, N.G., et al. (2003), p. 107.

[325] Cf. DOC (2008), p. 14.

of February 15, 2008, can severely impact the ability to distribute funds to the company's shareholders.

- **Incomplete Developments:** The construction of large, inner-city office buildings is often more capital intensive and takes a longer time span than the construction of other properties. Changes in the capital market environment (debt and equity) or demand for office space may limit the company's ability to finance the project and finish the development.
- **Terrorism and War:** Although all property types can be negatively affected by terroristic attacks, office buildings are more likely to be the target of a terroristic attack. Apparently, this makes Office REITs more vulnerable and can dramatically affect their pricing in the stock market as well as their dividend payment ability.
- **Offshoring of workplaces/Technology Changes:** The offshoring of jobs and services to other countries such as India, China, Philippines or South Africa has a negative impact on the demand for space, in particular office space. Nonetheless, other property types such as industrial real estate are affected with whole factories being relocated to other countries like China. Generally, it is accepted that the main factors influencing the offshore outsourcing movement were a combination of pressures to reduce labor costs and improve productivity, and an expanding, economical labor pool in other countries. Consequently, there is less demand for space in the domestic market. Also, technology changes, for example the internet, influence the demand or need for office space.

5.1.3 Real Estate Investment Strategies and Market Cycles of Office REITs

In contrast to other REIT property types such as Hotel REITs, the size of office properties owned by Office REITs has not continuously increased over the 12-year period. While the average size increased continuously until 2001, it started to decrease continuously thereafter. Also, the three years with the lowest average number were not at the beginning of the study period but from 2004 to 2006. This may be due to the sharp competition for office properties during this period that was reflected in a cap rate

decrease, as shown in chapter 2.1.1.[326] Similarly, the standard deviation by size within the Office REIT properties increased until 2001/2002 and decreased afterwards.

Also, the Office REIT sector is the most prominent in the 48 MSAs covered in this analysis. This means that more than 90% of the properties are within these markets, which is the highest percentage of all sectors. Moreover, this is demonstrated by the fact that the five largest markets represent on average 43% of all properties owned by REITs. New York-Northern New Jersey-Long Island, NY-NJ-PA and Los Angeles-Long Beach-Santa Ana, California, alone represent more than 22%. As a consequence, Office REITs are the most specialized by metro areas of all five REIT property sectors. This by itself is an interesting finding.

Interestingly, the Office REIT sector is one of the few sectors that has become more specialized in terms of its degree of concentration by NCREIF region while growing in size and market capitalization at the same time. Caused by the over-proportional growth of the Pacific region, in particular the Californian markets and decrease of the "USA (Others)" category that includes "B" and "C" metro areas and micro areas, the degree of concentration by NCREIF region has increased on the sector level while the degree of concentration has stayed the same. At this, factors like building class differences, size of the buildings and micro location are also of importance.

5.1.4 Links and Time Lags between Space Markets, FFO, and Pricing of Office REITs

Adapted from the results of the empirical analysis, Figure 129 illustrates the most important results of the CCF/lag analysis. For reasons of clarity, the findings of the sector- and company-based analysis are integrated.[327] Due to the different results by means of different REIT property-type sectors, the illustration or findings differ among the five sectors.

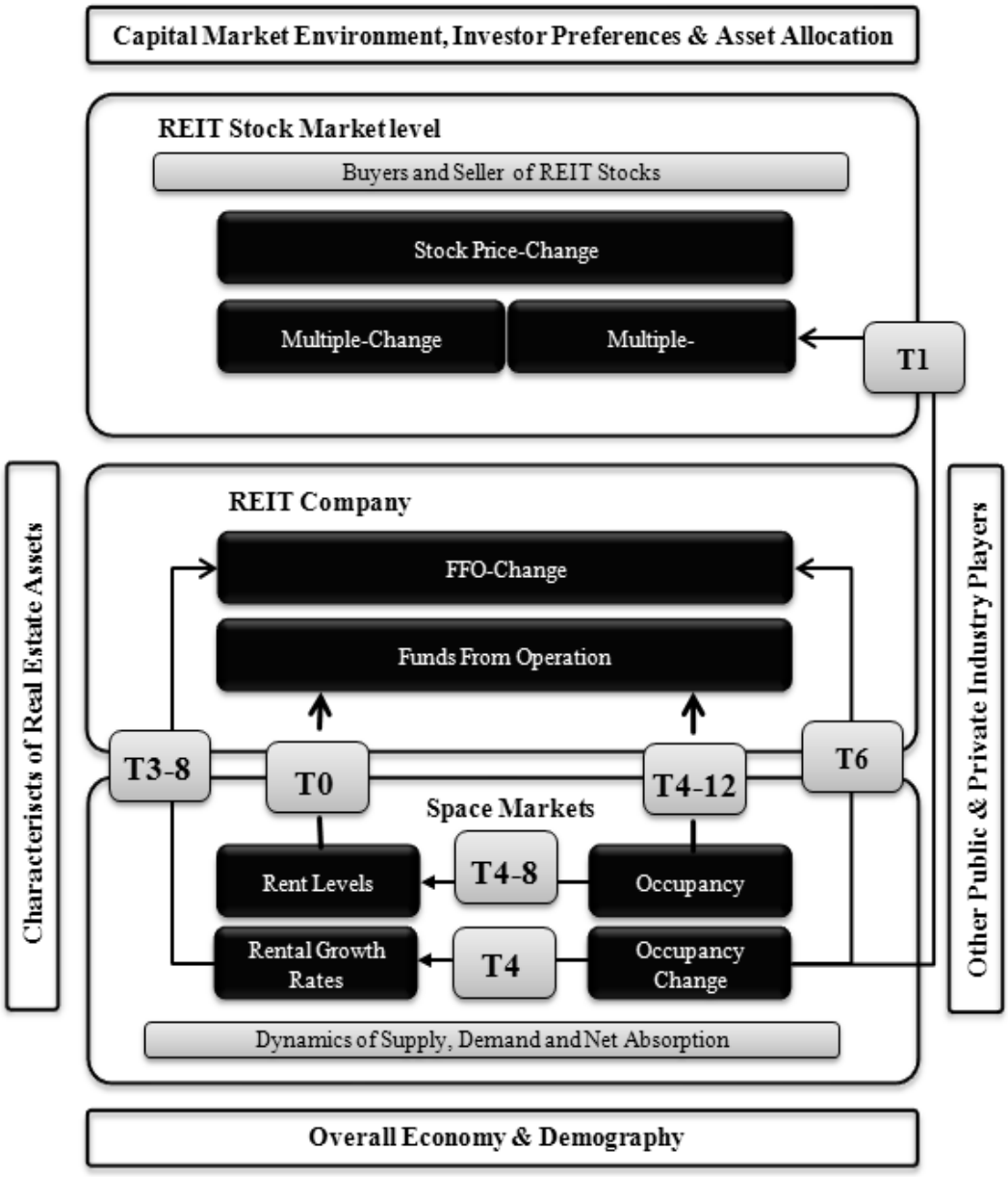
Starting with the link between space market factors, the analysis has found that occupancy (change) leads rent (change). Taking into account that empty space can be rented out relatively fast (if the building is not fully occupied and there has been no

[326] Refer to Chapter 2.1.1, p. 10.

[327] The pictured REIT-Real Estate Model shown is a simplification of the more detailed model developed in Chapter 2.2.2 aiming at showing only the links between the specified variables.

major tenant improvement) but that rents are subject to contractural agreements, this appears to be reasonable.

Figure 129: REIT-Real Estate System of Office REITs



Note: For reasons of clarity, the analysis only pictures the links between absolute factors (Rent, Occupancy and FFO *levels*) and growth rates (Rent, Occupancy and FFO *Change*).

Source: Own illustration.

Despite this fact, results show that rental *growth rates* are most likely to lead occupancy *levels*. This means that rent increases have a signalling or forecasting function for high occupancy levels, which appears to be obvious. Although this might be not intuitively clear, the large time lag between occupancy *change* and occupancy *levels* is the reason

for this situation. As shown in the preceding chapter, occupancy levels are still increasing although occupancy change is already decreasing but still positive. Therefore, occupancy levels are still increasing. Nonetheless, the link with operating performance and pricing is more complex and less obvious.

Notably, the results indicate a relatively large time lag between changes in the space markets and the operating performance (FFO) of REIT sectors and companies. The time lags range to up to 12 quarters for occupancy and FFO. Again, the illustration shows different *types* of links (FFO versus FFO Change). This would entail that the highest association between high occupancy levels – and similarly for rental growth rates – with FFO occurs after one to three years depending on the company. Taking into consideration the structure and length of rental contracts for office real estate, the results appear to be realistic. Also, the difference (or large range) for these two links in particular may result from different, weighted lives of leases, conditions of contract, and expiration dates of REIT companies. In sum, the REIT-Real Estate System of Office REITs has the longest time lags between space market factors and earnings of all five REIT property-type sectors.

Additionally, the range in terms of variance (quarters) for a particular link such as occupancy and FFO (from four to 12 quarters) is the highest for the Office REIT sector. Except for this, the analysis finds only weak evidence (only for occupancy change and FFO Multiples) of a link between space market cycles or earnings of REITs and their pricing. Nonetheless, the findings of the analysis suggest that it is possible to forecast the "earnings component" of REITs that accounts for approx. 5/12 of the total return of REITs.[328]

5.2 REIT-Real Estate System of Industrial Real Estate Investment Trusts

5.2.1 Investment Considerations for Industrial Real Estate Investment Trusts

More than other REIT sectors, the Industrial REIT sector has been subject to technology shifts. These technology shifts relate to the change from relatively small industrial

[328] Compare Figure 1: Private versus Public Real Estate Pricing – Return Components, p. 4.

properties that mainly have a storage or warehousing function to integrated logistics centers with specific requirements in terms of size, height, and access.[329] Modern logistic properties are integrated in an often complex supply chain that requires an adequate operation system from the Industrial REIT that owns the property. Beyond the sole supply of "space," Industrial REITs such as ProLogis offer an organizational structure, operating, and service delivery system (ProLogis Operating System®) to serve the needs of their customer base that has become more globally active and larger in size.

In this way, Industrial REITs have been affected by the globalization or internationalization of their tenants. This means that most of ProLogis's customers now have an international scope that requires a local presence in terms of logistics and warehousing. As a consequence, ProLogis – similar to other Industrial REITs such as AMB Properties Corporation – has grown with its customers during the last decade and has become extremely internationalized in its operations. This growth is reflected in the company's growing market capitalization as shown in chapter 4.1 and the share of foreign properties (more than 40% for ProLogis).

Moreover, Industrial REITs may be different in terms of their property subtypes. This means that ProLogis is an Industrial REIT that focuses on large, integrated distribution facilities. These facilities are, in most cases, part of a specific supply chain and function as processing centers with a smaller storage part. Other REITs such as the Liberty Property Trust own a more diverse portfolio in terms of subcategories of industrial properties with a national focus. This means that the portfolio consists of assembly, light manufacturing, development facilities/research, multi-tenant industrial, and storage properties.[330]

Compared to the Office REIT sector, Industrial REITs are less focussed and more stable in terms of tenant base. This stand for the factor that Industrial REITs are less dependent on one particular industry such as the Financial and Banking industry. Tenants of industrial space come from a more diverse range of industries, from manufacturers such as large automotive companies to consumer goods or the food processing industry. Although all of these companies are influenced by the overall economic situation, the

[329] Cf. HWAHSIN, C./MEJIA, L.C./TU, C.C. (2006), p. 249 et seq.
[330] Cf. LIBERTY (2008), p. 4.

business cycles of car manufacturers and the computer industries seem to be less correlated. Consequently, the space market cycles of industrial real estate are less volatile compared to office real estate or hotel properties, as presented in chapter 4.3.6.[331]

Compared to the other property types, utilities costs are least important for this sector from a relative standpoint. Since industrial properties are normally leased triple-net, meaning the tenant assumes utility costs, energy costs are not as relevant as they are in other property sectors. This means that energy costs range from 40 cents to 50 cents a square foot on an annual basis, accounting for less than one percent of total operating costs.[332]

5.2.2 Risk Factors of Industrial Real Estate Investment Trusts

- **Foreign Property Holdings:** The two largest Industrial REITs – ProLogis and AMB Properties Corporation – that constitute the majority of the Industrial REITs sector by market capitalization are also the two REITs with the highest foreign property holdings of Equity REITs by total are of foreing properties and relatively to all properties of the respective portfolio (defined as the share of foreign properties of the overall portfolio). Due to the characteristics of industrial real estate and the need to service its customer globally, Industrial REITs often have a higher share of foreign properties. This can be beneficial as well as adversarial for the REITs' performance, depending on a subset of factors such as the exchange rates or the development of overseas property markets. For example, ProLogis generated 42% of its total revenue in 2007 from foreign operations and property holdings.[333] Since the foreign operations can cause difficulties in terms of staffing as well as managerial operations in certain regions, the inherent risk may affect ProLogis risk profile negatively. In this way, unexpected changes in regulatory requirements in these countries as well as tax changes may affect this company's ability to make payments to its shareholders. Also, complying

[331] Refer to Chapter 4, p. 129.

[332] Cf. FIRSTINDUSTRIAL (2008), p. 35.

[333] Cf, PROLOGIS (2008), p. 19.

with multiple and potentially conflicting laws in these countries requires additional management attention. In addition to the possibility of political instability or terroristic attacks, different foreign ownerships restrictions such as in China pose additional challenges for the management and risk for investors in this company.

- **Environmental Risks:** In light of the changing climate in terms of attention that is drawn to environmental risks, changes or tightening of federal, state, and local laws can cause significant costs for Industrial REITs. Although all REITs may be affected by these changes, Industrial REITs are particularly affected. Since industrial properties are more likely to be subjected to costs caused by the remediation of toxic and hazardous material, the cost of removal could be substantial. Even if an Industrial REIT is not aware of pollution caused by tenants of fabrics or other industrial properties owned by these companies, the law often imposes liability on the owner (an Industrial REIT). Moreover, industrial properties in particular – in urban as well as industrial areas – may have been polluted by former tenants. Since an "environmental due diligence" or insurance policies cannot mitigate this risk completely, investors should be aware of this risk.
- **Operation Segments:** Several REITs have started to enter more complex structures with different operations segments. ProLogis, which is the largest Industrial REIT, has taken a lead role, which makes the analysis of the company more complex. In addition to the "traditional" property operations, ProLogis has an investment management segment and a development or CDFS segment. In this way, ProLogis contributes properties to funds that depend on access to debt and equity capital and have projected earnings levels.[334]

  Failure to meet the projected earnings or delays in the completion of these properties caused, for example, by a change in the capital market environment or the private real estate markets can have an adverse effect on the dividend paying ability of a REIT. Therefore, investors should be aware of the complexity of operational segments that certain REITs such as ProLogis have.

[334] Cf. Ibid., p. 15.

Although these different operations can be beneficial, they also change the risk profile of ProLogis as the by far largest REIT in this sector.

5.2.3 Real Estate Investment Strategies and Space Market Cycles of Industrial REITs

In contrast to Office REITs, the average size of industrial properties has continuously increased over the 12-year period. In terms of average size, industrial properties have increased continuously from 114,000 square feet in 1995 to 157,000 square feet in 2006. This demonstrates the technology shift away from "traditional" warehouses to larger, integrated logistics centers.

This is reflected in the median size, which increased from 76,000 square feet in 1995 to 96,000 square feet in 2006. This is also mirrored in the standard deviation that increased from 127,000 square feet to 201,000 square feet, meaning that the portfolios are more diverse in terms of size.

In terms of space markets, the exposure has shifted from traditional industrial regions to the large air and port hubs. Furthermore, the analysis has shown that Industrial REITs have changed their investment focus to the South-West and Pacific regions, which benefited most from the increased amount of trade with Asis, in particular China.

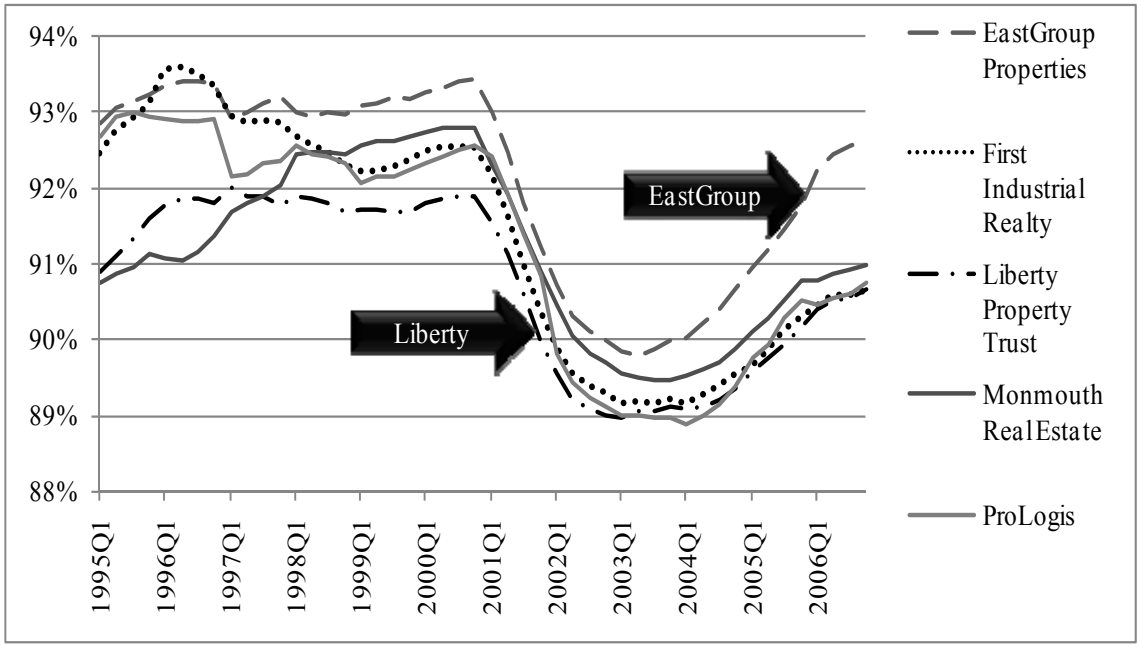
Moreover, the Industrial sector – in contrast to the other sectors – has kept the degree of concentration on the same level over the whole study period. While most sectors have become more diversified by growing the real estate investment base, Industrial REITs have remained (on a sector level) at the same level of concentration in terms of NCREIF region and metro areas.

As shown in the diagram below, all Industrial REITs followed the overall trend in terms of occupancy. Also, it seems as if Industrial REITs have become more aligned in their space market factors. This might be caused by the increasing portfolio size of all Industrial REITs in the sample.

Nonetheless, certain companies such as EastGroup Properties significantly outperformed the sector or underperformed, such as the Liberty Property Trust. This shows that all investors in this sector are subject to the systematic risk of this REIT

property-type sector, but companies within the sector differ in their space market performance.

Figure 130: Occupancy Cycles of Industrial REITs



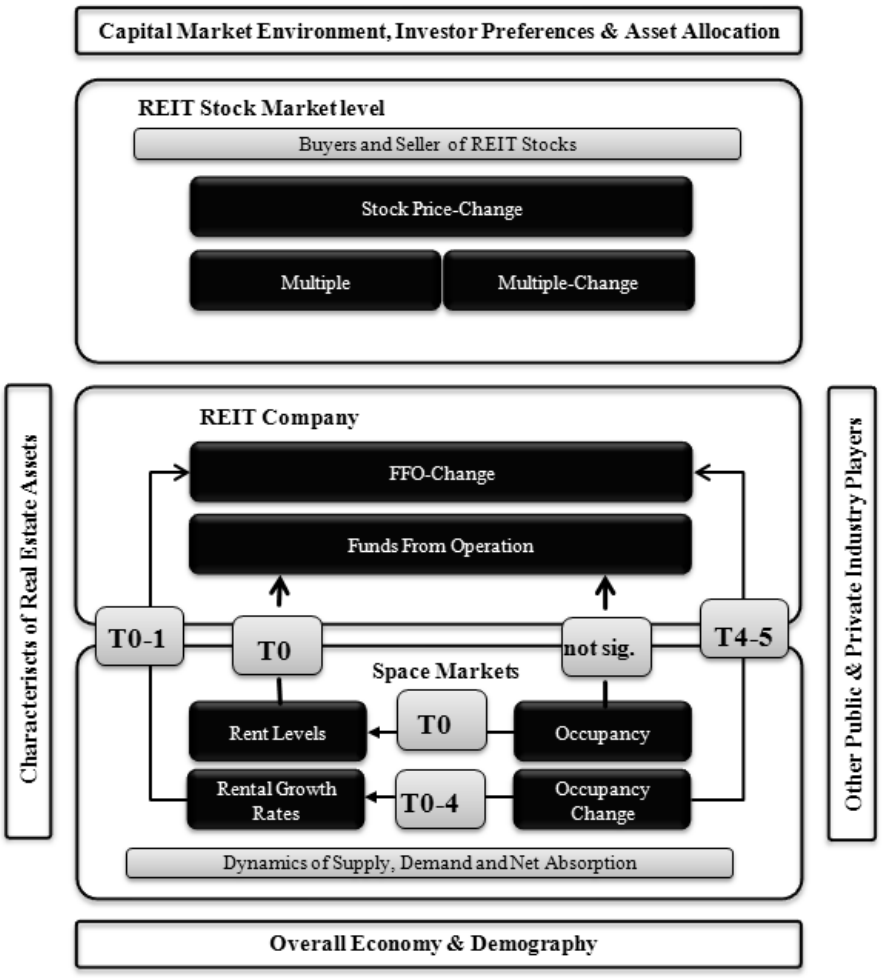
Source: Own illustration.

5.2.4 Links and Time Lags between Space Markets, FFO, and Pricing of Industrial REITs

Compared to the results for the Office REIT sector, the diagram below illustrates that similar to the Industrial REIT sector there is no evidence of a relationship to the pricing of REITs by stock price changes or in terms of FFO multiples. Again, the diagram suggests that occupancy change is the earliest indicator for the forecast for FFO Change. This holds true for all sectors (aside from Hotel REITs where Rent Change leads Occupancy Change).

Also, the results for the relationship between absolute levels have a different meaning than growth rates. For example, the link of four quarters between occupancy change and rent change suggests that a high (or low) occupancy change, e.g., 5% in quarter one of a given year is very likely to be reflected in a positive rent change four quarters later. These space market factors are not the actual occupancy levels of a REIT but the theoretical occupancy based on the weighted exposure to different metro areas.

Figure 131: REIT-Real Estate System of Industrial REITs



Source: Own illustration.

As depicted in the diagram, the analysis does not find significant results for all links. Therefore, the boxes for the time lags in quarters may show "not significant," indicating that the links found did not meet the critical coefficients and t-values. Moreover, the largest variance seems to be between occupancy change and rental growth rates. The company-level results vary from no time lag to up to one year. This may be caused by the different market cycle positions of individual markets that different companies have a strong exposure in. Consequently, their ability or speed to capitalize on changes in the demand for industrial space by means of rent increases differs.

5.3 REIT-Real Estate System of Retail Real Estate Investment Trusts

5.3.1 Investment Considerations for Retail Real Estate Investment Trusts

Investing in Retail REITs, this REIT sector is most likely to be the most diverse in terms of property subtype. This implies that Shopping Center, Regional Mall, and other Retail REITs are not affected in the same way by seasonality, changing consumer preferences, and the overall economy. Also, these subtypes of Retail REITs have different concepts and may face competition from other public and private players.

First, Regional Mall REITs such as Simon Properties face less competition than Shopping Center REITs due to the large amount of capital as well as economies of scale that function as barriers to entry for other industry participants. Since Regional Malls have to deal with a large number of tenants, the organizational requirements are higher than for Factory Outlet REITs. For example, Simon Properties has more than 5,100 different retailers with none of these retailers representing more than 2.1% of the overall rents.[335] Regional malls typically have more than one anchor (Simon Properties as an example has 168 malls with 675 anchors that are mostly national retailers)[336] within these malls normally ranging from 350,000 square feet to more than 2 million square feet.

Second, Shopping Center REITs such as Kimco Realty Corporation focus on neighborhood and community shopping centers. Consequently, they are less affected by changes in the economic situation compared to Regional Mall REITs. Typically, these neighborhood shopping centers are designed to attract local customers anchored by a supermarket or department store. In this context, Shopping Center REITs have to compete with regional and local commercial developers and real estate companies in addition to other Shopping Center REITs.

Third, Factory Outlet REITs, such as Tanger Factory Outlet Centers, Inc., that constitute the majority of "Retail: Other" are based on a different concept that may be influenced differently by changes in the economic environment. Factory outlets offer mostly premium brands at a significant discount by eliminating third-party retailers.

[335] Cf. SIMON (2008), p. 5.

[336] Cf. Ibid., p. 3.

Furthermore, Factory Outlet REITs have significantly lower operating costs than shopping centers and regional malls.[337] Additionally, Factory Outlet REITs have benefited from several factors that contributed to the growth of this retail segment. For example, retailers are able to remain control of their distribution channel instead of giving their products to discount stores. Also, outlet stores enable retailers to sell out-of-season stock, damaged, or overstocked products.

In this context, Factory Outlet REITs such as Tanger Factory Outlet Center, Inc. managed to establish their company names as powerful brands and take advantage of economies of scale that are particularly important in the Retail sector.[338] These economies of scale have contributed to the fact that Retail REITs have the highest relative share in terms of properties owned from the overall universe of retail properties.

Furthermore, Factory Outlet REITs are less subject to bankruptcies of their tenants than Shopping Center and Regional Mall REITs. This is based on the fact that nearly all of the tenants are large, national, or international manufacturers and brands that have lower default rates than smaller, local, or regional retail chains and brands. This also contributed positively to a more stable tenant base and occupancy.

For example, Tanger Factory Outlet Center, Inc. had an occupancy rate of 98% with average tenant sales of $342 per square foot a year as of December 31, 2007. In addition, the average occupancy has always been above 95% since 1981.[339] Also, Factory Outlet REITs have benefited from changing consumer preferences for factory outlet centers over full- and off-price retailers because these companies are not able to offer the same variety of name brands at discounted prices.

Interestingly, utilities costs can range widely between different types of retail properties. According to the International Council of Shopping Centers (ICSC), utilities at enclosed malls are $2.06 per square foot, compared to $16.37 per square foot of total operating expenses. In contrast, open-air centers, by comparison, run at a relatively low amount of $0.25 per square foot ($4.10 total costs).

[337] Cf. TANGER (2008), p. 25 and F-3.

[338] Cf. Ibid., p. 2.

[339] Cf. Ibid., p. 16.

5.3.2 Risk Factors of Retail Real Estate Investment Trusts

- **Tenant Bankruptcies:** Bankruptcies of retailers occur frequently in the operation of a mall or shopping center. Bankruptcies of retailers or a group of retailers can limit the releasing ability to other tenants. Since the success of a regional mall or shopping center depends on a complex interplay of the different tenant groups in terms of industry and tenant types in terms of size, tenant bankruptcies constitute a major risk specific to Retail REITs.
- **Common Area Maintenance:** The amount of Common Area Maintenance (CAM) costs of Retail REITs is often higher than for other REIT property types such as Industrial REITs. This is a risk because these costs typically include energy, insurance, and security costs that are often not fully reimbursable. Therefore, an increase in energy costs can significantly decrease the available cash flows for distribution to shareholders.
- **Joint Ventures:** Similar to ProLogis, Retail REITs such as Simon Properties have entered multiple national and international joint ventures. Since the Retail REIT has only limited control over these properties, refinancing or selling of these properties is more difficult and may not always be possible although required by the REIT. For example, Simon Properties owned 181 properties as of December 31, 2007, of which 59 were owned in international joint ventures where the other owners have participating rights. Moreover, not all of these properties are managed by Simon Properties, which limits the managerial control of the operation of these properties.[340]
- **Retail Operations Risk:** Concentration in the retail property market means that Retail REITs can benefit from size because retail real estate in particular is subject to the level of consumer spending, the willingness of retailers to lease in regional malls, shopping centers, or other retail property types, and seasonality. Although all REIT property sectors have property-type specific risks, the retail industry is the industry with the second-highest bankruptcy rates.[341] In this way, Retail REITs may be more affected by a recession or economic downturn. It is important to note that Retail REIT subsectors are affected differently by a recession. This means that regional malls could be

[340] Cf. SIMON (2008), p. 11.

[341] Cf. HELLER, L. (2002), p. 1.

affected more drastically because they are less focused on retailers that offer "everyday products." As a consequence, shopping center REITs such as the Kimco Realty Corporation may be less severely affected by a recession than a Regional Mall REIT such as Simon Properties, Inc.

- **Anchor Tenants:** Since malls are typically anchored by a department store or other nationally recognized tenants, Retail REITs depend on the availability and financial strength of their anchor tenants. This means that in case that an anchor tenant leaves a regional mall or different regional malls of a Retail REITs portfolio, this impacts the functioning and success of the whole regional mall. Since the retail industry is subject to extremely intense competition, as described in the preceding paragraph, the insolvency of an anchor tenant or loss of an anchor tenant because of an unfavorable position in terms of the competitiveness of the malls, for example, caused by the opening of a new mall, puts the whole financial success of a mall at risk.

5.3.3 Real Estate Investment Strategies and Space Market Cycles of Retail REITs

In contrast to the Industrial REIT sector, the size of retail properties has not increased continuously over the study period. While the size decreased until 2001, the size started to increase until 2006 to the same level as in 1995. Nonetheless, these findings refer to Retail REITs on an aggregate level, not differentiating between regional malls and shopping centers. Therefore, the explanatory power is limited because the change in size may be caused by a larger number of regional malls in relation to shopping centers and vice versa. The median by means of size confirms these results.

Since most shopping centers and regional malls are not within the large MSAs that are covered separately, the Retail REIT sector has the largest share of "USA (Others)," which covers the smaller metro areas and micro areas. In particular, the share of "USA (Others)" is approximately 40%. Therefore, the individual size of metro areas typically ranges between 2% and 4% for retail properties.

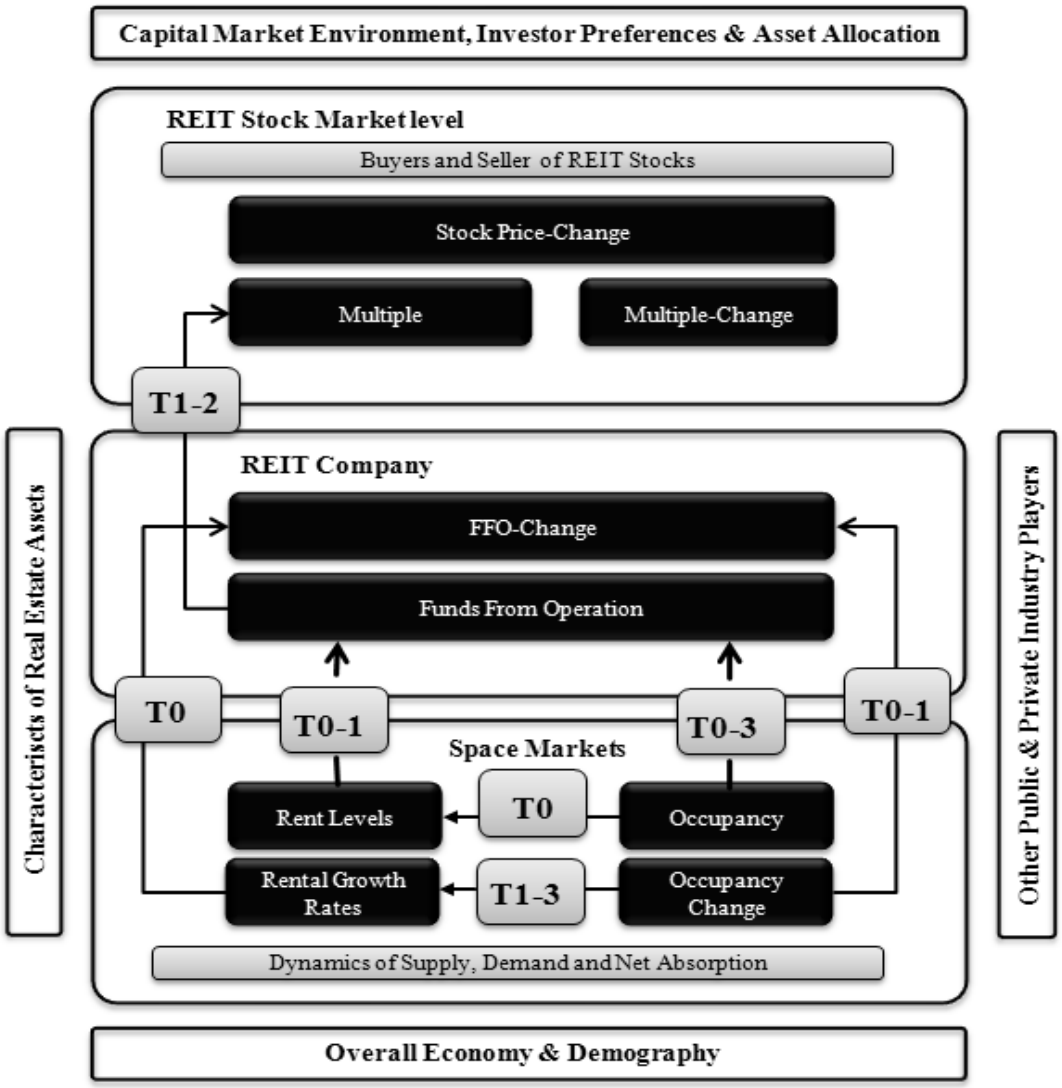
Similar to Apartment REITs, Retail REITs have become more diversified by metro area and NCREIF region. This means that most Retail REITs grew from a state to a regional to a national level over the study period. Due to the large share of "USA (Others)," the

degree of concentration is biased in a sense that the degree of concentration is stated as high.

5.3.4 Links and Time Lags between Space Markets, FFO, and Pricing of Retail REITs

Based on the evidence summarized in the diagram below, it can be concluded that Retail REITs are able to capitalize on (or suffer from) changes in the space markets in terms of FFO very fast. This holds true for growth rates, e.g., 2% increase in occupancy in the underlying space markets and the effect in percentage on FFO as well as for rent levels and FFO levels.

Figure 132: REIT-Real Estate System of Retail REITs



Source: Own illustration.

Taking into consideration that Retail REITs often participate in the sales of their stores, these companies benefit from improving space markets characteristics immediately. As a consequence, occupancy change in the underlying space markets is a very good indicator or "signal" of the development of FFO (change) in the same and the following quarters. Therefore, investors can benefit from including market cycle analysis in their earnings forecast of REITs that constitutes a large share of the total return of REITs in most years. Except for these links, there is little evidence for a link between the FFO of Retail REITs and the height of FFO multiples. The results imply that a high FFO is followed by a high FFO multiple in the same quarter or a quarter later.

5.4 REIT-Real Estate System of Apartment Real Estate Investment Trusts

5.4.1 Investment Considerations for Apartment Real Estate Investment Trusts

Compared to the other four REIT sectors, Apartment REITs seem to offer the most stable space market fundamentals to investors. As shown in chapter 4.3.6, this REIT property-type sector offers the least volatile occupancy and rental levels. Due to the diverse and granular tenant base of Apartment REITs, this REIT sector also shows the most stable FFO levels accordingly because of the high degree of cash flow diversification. In most cases, Apartment REITs such as Post Properties, Inc. own and manage apartment communities with high service and quality levels.[342]

Apartment REITs invest in different property subtypes such as "garden style assets" or "elevator markets" such as New York. This also has implications for the operating expenses. For example, the mean annual utilities cost in New York (predominantly elevator markets) of $1,838 differ from a garden-style community in San Diego with approximately $713 per unit.[343] Also, communities can either be master metered, where the owner pays for the energy or individually metered, where the tenants pay individually. Consequently, utilities costs are more than double in elevator markets.

[342] Cf. POSTPROPERTIES (2008a), p. 2.

[343] Cf. NAREIT (2008b), p. 2.

In the “Survey of Income and Expenses in Rental Apartment Communities (2003)," the National Apartment Association found that utilities run $317 per unit per year, or 9.6% of total operating expenses, for all individually metered market-rent properties, while master-metered complexes had average costs of $893 per unit per year, or 20.5% of total operating expenses.[344] This illustrates the differences between individually- and master-metered communities. Since Apartment REITs can be impacted negatively by rising energy costs in conjunction with flat rates for utilities, various companies have started to introduce energy saving programs and replace windows and doors, for example.[345]

To achieve operating efficiency, most Apartment REITs try to achieve a critical mass of more than 1,000 apartment units in one market sometimes even more, such as Post Properties with 2,000 apartment units, or $200 million of investment in a particular market.[346] Since the management of apartments and the often yearly releasing can be personnel-intensive, this relatively high number is necessary to realize economies of scale.

Furthermore, various Apartment REITs have a condominium conversion operating segment in addition to the management, investment, and development of apartments. Condominiums are homes for sale instead of rental apartments. Often, companies try to convert and sell older or less competitive properties as condominiums. These properties do not necessarily have to be former apartment properties but could have also been office buildings.[347]

Similar to Office REITs, Apartment REITs are relatively focussed in terms of markets and NCREIF regions compared to Industrial, Retail, and Hotel REITs. This illustrates that geographic diversification is not crucial for an Apartment REIT, for example, BRE Properties, Inc. is focused on the Pacific region.[348] Although this makes these companies more dependent on the economic and demographic development in these markets, various Apartment REITs have evolved as regional specialists.

[344] NAA (2008), no page.
[345] Cf. HOMEPROPERTIES (2008), p. 5.
[346] Cf. POSTPROPERTIES (2008a), p. 2.
[347] Cf. Ibid., p. 3.
[348] Cf. BRE (2008b), p. 10.

5.4.2 Risk Factors of Apartment Real Estate Investment Trusts

Apartment REIT-specific risk factors that may be different from other REITs are as follows:

- **Rent Control and Stabilization Laws:** In contrast to other REIT sectors, the Apartment REIT sector may be affected by rent control, stabilization laws, or government-supported housing, which means additional competition. These actions could prevent and hinder Apartment REITs to raise their rents. This could substantially decrease the profitability of an Apartment REIT and its ability to offset increases in operational costs such as increasing energy costs. Also, additional competition from other housing providers can affect an Apartment REIT's performance and make it less attractive for investors.
- **Home Ownership versus "For Rent" Residential Real Estate:** Although Apartment REITs act in the area of commercial for-rent residential real estate instead of residential for-sale home ownership, problems in the housing markets can negatively affect Apartment REITs. Although the economic drivers of rental apartments are not congruent, a crisis in the housing market can affect in particular an Apartment REIT's ability to refinance with equity as well as debt capital in the public and private markets. Although the subprime crisis refers to products associated with "homeownership," not commercial for rent real estate, the pricing of listed (Apartment) real estate decreased in the short term.[349] From an investor's perspective, a high foreclosure rate in the private housing market is beneficial for the rental market because more people are forced to rent properties instead of owning them. This should theoretically increase not only the earnings but also the pricing of Apartment REITs.
- **Favorable Mortgage Rates and Housing Alternatives:** Favorable mortgage rates in the overall market that are external to an Apartment REIT can make alternative housing options as described in the preceding paragraph more competitive and Apartment REITs less competitive. During periods of favorable mortgage rates, housing options in terms of home ownership become more attractive for potential customers of Apartment REITs.

[349] Cf. NAREIT (2008a), no page.

Consequently, Apartment REITs (and in particular their competition in terms of alternatives) are different from the other REIT property-type sectors.

- **Demographics and Household Formation:** More than other REIT sectors such as Hotel or Industrial REITs, Apartment REITs are subject to demographic factors and the impact of changes in household formation. This means that the demand for apartments is heavily influenced by demographics. For example, a tightening of immigration laws that reduces the number of immigrants that largely rent instead of own a house can affect an Apartment REIT's customer base.[350] Also, changes in household formation can affect a REIT positively as well as negatively.
- **Condominium Conversion:** Often, Apartment REITs engage in condominium conversion (for sale) that involves unique risk and challenges for an Apartment REIT.[351] In a condominium conversion, an Apartment REIT converts an existing building into for-sale housing projects. In this context, the inability to achieve the required zoning approvals and release from financial or former contractual obligation can pose a risk for the REIT. Also, the conversion into condominium includes the ability to understand the costs of this conversion and the correct standards in terms to meet a competitive market position. In addition to a lack of potential buyers, oversupply of condominiums in certain local markets increases the risk for investors.[352]

5.4.3 Real Estate Investment Strategies and Market Cycles of Apartment REITs

Typically, the average size of apartment buildings owned by Apartment REITs is between 240 and 290 units. Also, Apartment REITs tend to have at least 1,000 units in one metro area to realize economies of scale and up to 4,000 units in one project. In comparison to the other sectors, the Apartment REIT sector has not grown as stellar as the other sectors, only doubling the number of buildings over the 12-year period. In contrast to the Retail REIT sector, less than 20% of the properties are in the category

[350] Cf. ANONYMOUS (2007a), p. 5; ANONYMOUS (2002a), p. 30 et seq.

[351] Cf. POSTPROPERTIES (2008a), p. 10.

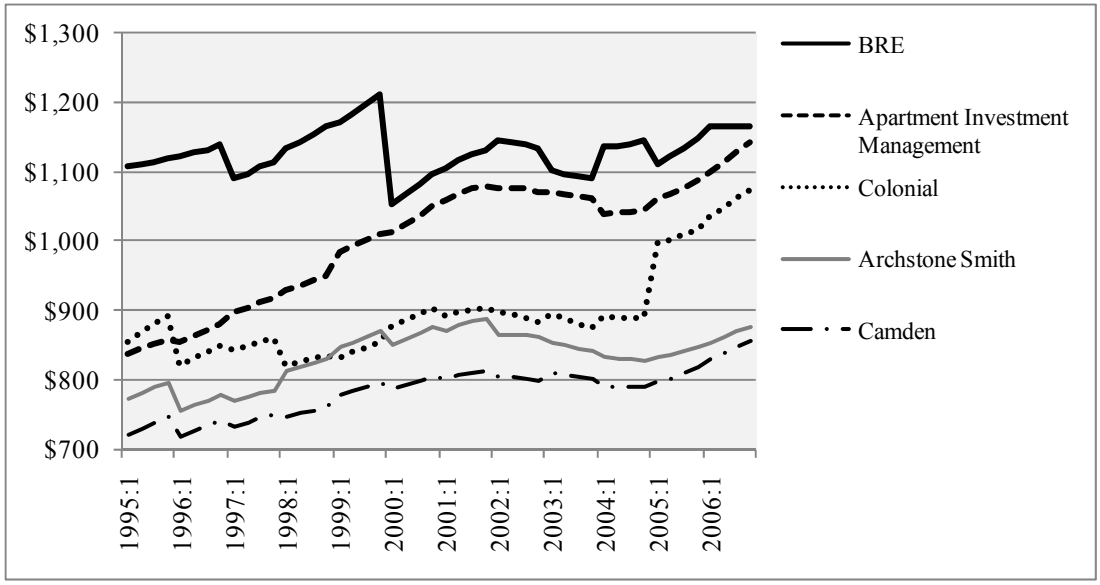
[352] Cf. TURRA, M./NELSON, M. (2007); MIGDAL, N.F. (2006), p. 25-27.

"USA (Others)," indicating that most of the properties are in the large, dense metro areas.

One explanation of the relatively conservative growth of the Apartment REIT sector in comparison to the other four sectors is the competition from other housing options, in particular from home ownership. Due to favorable mortgage rates, as shown in Figure 6,[353] homeownership became an attractive option for part of the customer base of Apartment REITs.

Similar for most Apartment REITs, companies strive to realize a critical mass (>2,000) of apartments in one relevant market, uniform properties, above average quality building quality, low average age properties, and cash flow diversification.[354] Typically, Apartment REITs sell older buildings and start development projects in new markets based on their investment strategy.

Figure 133: Comparison of Rent Cycles – Apartment REITs



Source: Own illustration.

As shown in the diagram below, the space market levels of REITs that determine their earnings and dividend paying capacity are not stable over time. Even for BRE, which operates in very stable markets with high rent levels, the rent levels did change over time. Also, REITs change in terms of the levels of their portfolio, as demonstrated by the rent levels of Apartment and Investment Management and Colonial. Starting with

[353] Refer to Figure 6, p. 15.

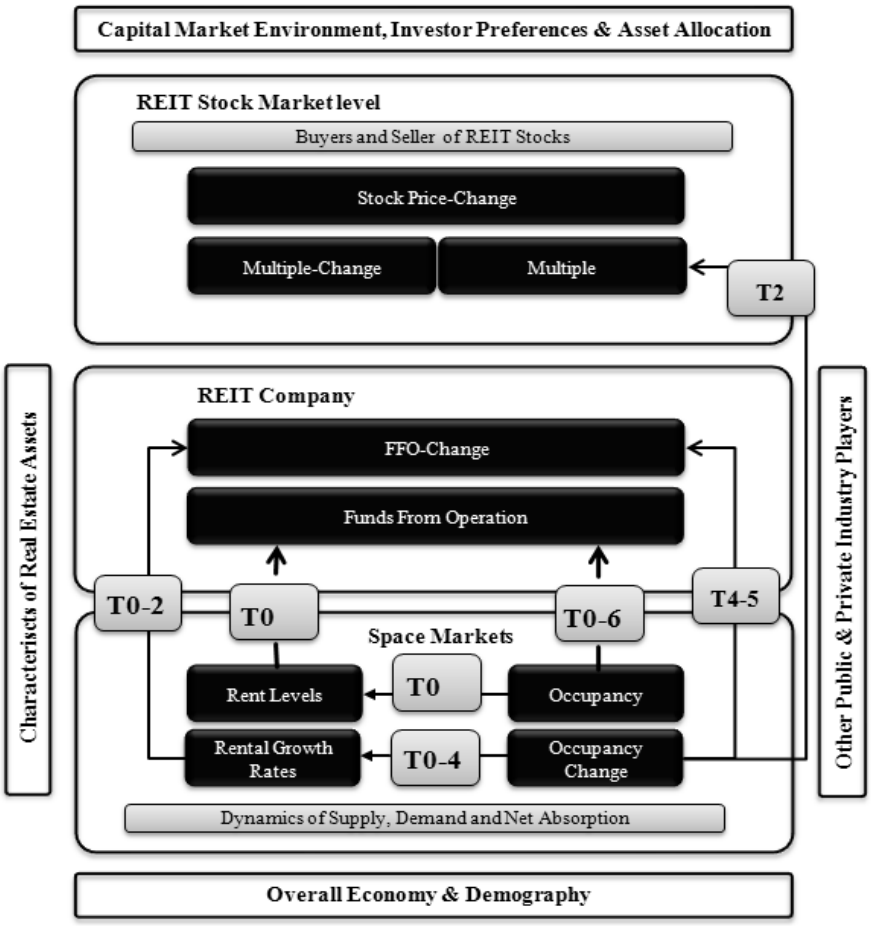
[354] See for example POSTPROPERTIES (2008a), p. 2.

around $850 in 1995, rent levels of this company topped $1,150 in 2006, as shown in the diagram. In contrast, other companies such as Archstone Smith and Camden Properties could not follow this development. Therefore, investors need to analyze the space market cycles of individual REITs when making investment decisions.

5.4.4 Links and Time Lags between Space Markets, FFO, and Pricing of Apartment REITs

Similar to the results for Industrial REITs, Apartment REITs have shorter time lags than Office REITs but longer time lags than Hotel REITs. Again, occupancy change seems to be the earliest and best indicator for the earnings of REITs. Nonetheless, the links between growth rates vary among companies. Since there are no significant links between space markets or earnings and the pricing of REITs, there must be other factors that determine the pricing of REITs.

Figure 134: REIT-Real Estate System of Apartment REITs



Source: Own illustration.

Also, the results suggest that REITs – in most cases – are not able to benefit from a change in occupancy or rent in the same quarter but in most cases not till the following quarters. Consequently, observing changes in the current space markets has a limited explanatory power for a change in earnings by FFO. This is an important finding because it also provides an opportunity to improve the forecasting of FFO by including time lags. By doing this, investors could make better investment decisions or analysts more precise forecasts.

5.5 REIT-Real Estate System of Hotel Real Estate Investment Trusts

5.5.1 Investment Considerations for Hotel Real Estate Investment Trusts

Investing in lodging and resort REITs, investors not only have to differentiate between different regional markets but also the market price segment a REIT is invested in.[355] Whereas REITs such as Host Hotels & Resorts are mainly invested in the luxury and upscale segment, other REITs focus on the economy market price segment. Rental growth rates can differ significantly in different market segment.

In order to achieve FFO growth and capital appreciation, the success of the management team of Hotel REITs depend critically on their space market selection and property subtype specialization decision. In this way, HST (for example) is diversified regarding regions, including 4% of international hotel property holdings. The Pacific region, including California and Hawaii, represents a quarter of the whole portfolio by number of rooms. Nonetheless, the Mid-Atlantic region, including New York, and the New England region had the highest RevPAR growth.

The reasons for positive or negative RevPAR growth can be quite different. While the New England region profited from a strong group demand for downtown Boston hotels, the DC metro area suffered from a decline in congressional activity and renovations work. The North-Central region benefited from an increase in average occupancy and room rate due to a number of city-wide convention events. On the other side, the Florida

[355] Cf. STR (2007a), no page; the five categories of a metro STR market which are defined by actual or estimated average room rate are: Luxury- top 15% average room rates, Upscale - next 15% average room rates, Mid-Price - middle 30% average room rates, Economy - next 20% average room rates, Budget - lowest 20% average room rates. In rural or non-metro STR markets, the luxury and upscale segments collapse into the upscale form.

market was influenced by an increased number of group bookings and transient demand.[356] Recapitulatory, this illustrates the different fundamentals that drive RevPAR and FFO. It also demonstrates the diversification potential of a REIT that specializes in one particular property type.

In addition to the seasonal component of hotel space markets, and lodging and resort REIT performance accordingly, as shown in chapter 4.5.1.5, the refurbishment and replacement cycle differentiates Hotel REITs from the other four REIT property sectors. Refurbishment mainly refers to the renewal of hotel rooms, which typically occurs every seven years. Although the timing of refurbishments is subject to the economic environment and cash requirements of the REIT, Hotel REITs divide costs normally into three categories: soft goods, hard goods, and infrastructure. Whereas soft goods refer to items such as carpeting, curtains, or wall vinyl, hard goods refer to items such as furniture or desks that are not replaced that frequently. Infrastructure refers to more physical plants such as fire and security systems, which are maintained on a regular basis and replaced at the end of their useful lives. According to the management agreements, HST, as an example, is required to spend about 5% of the gross annual income of a hotel for refurbishment, not including infrastructure improvements. This equals $200 to $250 million annually.[357] Furthermore, Hotel REITs undertake various projects to increase the ROI of the underlying real estate portfolio. In comparison to the renewal and refurbishment work, these projects usually include significant improvements and upgrades of hotels. This could be a redesign, an expansion of the food and beverage operations, or an adaption to the market conditions, for example, the addition of a restaurant or a spa.[358]

The lodging industry is highly competitive and can be characterized by a constant proliferation of the various brands. Competition is often specific to individual markets. Therefore, the success of the properties of a REIT also relies on other factors such as the brand under which it is managed, amenities, and additional services for the guests besides typical real estate factors such as the micro location and property conditions.

[356] Cf. HST (2007); Those traveling as part of an organized group, meeting or convention are referred to as "Group" customers. Individual travelers are referred to as "Transient" customers.

[357] Cf. HST (2005), p. 7.

[358] Cf. HST (2006), p. 4.

Since REITs are not allowed to operate and manage hotels by themselves, competition can include hotels from the same brand of a particular price segment such as the upper-upscale full-service segment. The management contracts often do not have restrictions regarding the ability of operators to operate, convert, or franchise new hotel properties in a specific market. Consequently, the properties of a lodging and resort REIT compete with hotels of the same brand in a region in some cases. For example, Host Hotels & Resorts has agreements with the following brands: Marriott, Sheraton, Westin, Ritz-Carlton, Hyatt, W, Hilton, Embassy-Suites, Four Seasons, Fairmount, St. Regis, Delta, Swisshotels, and others, but not all of their hotels are owned by HST.[359]

It is important to understand the regulatory framework, particularly the current REIT law and its implication under which lodging and resort REITs are restricted from operating and managing hotels (similar to healthcare REITs).[360] Also, it is necessary to understand from an investor perspective the dynamics of the lodging industry that differentiate Hotel REITs from other REIT sectors. Hotel REITs operate in an extremely diversified market that consists of private and public entities under various brand names. In comparison to the more common real estate segments, the lodging industry has a unique structure with the following key participants that act in the space markets for hotel:

- **"Owner-managers":** Own and operate the properties with their own management teams. Thus, the properties may be managed under a franchise contract, by an independent hotel brand, or by the manager.
- **"Owners":** Owns the hotel and a third party manages the hotel.
- **"Manager/Operators":** Manage hotels on behalf of the owner but do not have a brand by them, but the hotel could be managed under a franchise agreement.
- **"Franchisors":** Own a brand and offer marketing support, recognition, and centralized booking systems to their customers.
- **"Franchisor/manager":** Owns a brand and manages the hotel for the owner.

Because a "taxable REIT subsidiary (TRS) may not operate or manage lodging or healthcare facilities, but a TRS may lease lodging facilities from its affiliated REIT at

[359] Most properties are leased to a TRS.

[360] Refer to Chapter 2.3.2, p. 44.

market rates so long as an independent contractor operates and manages the facilities,"[361] Hotel REITs have to lease nearly all of their properties to operators.[362] Therefore, the availability and skills of the operator are essential for the success of a lodging and resort REIT.

Consequently, operational agreements are more important for Hotel REITs. These management agreements consist of terms and fees for the operational services (typically divided into a base fee, for example, 3%, and an incentive component, e.g., 20%[363]), chain services, working capital and fixed asset supplies and furniture, fixtures, and equipment replacement. Most likely, the operational agreements require the REIT to maintain the working capital for each hotel. Furthermore, the operational agreements include other specifications such as "termination on sale," "performance termination" in case the operator does not meet specified performance benchmarks, and in terms of building alterations and improvements.

5.5.2 Risk Factors of Hotel Real Estate Investment Trusts

Due to the daily pricing and extremely short leases, Hotel REITs are subject to particular business risks:

- **Terrorist attacks:** Future terrorist attacks would adversely affect Hotel REITs immediately. Even a change in the terrorist alert system can affect the performance of REITs, both the income and the pricing component of REIT returns.
- **Unionization:** Unionization of the labor force is a factor that can adversely affect the revenue of Hotel REITs.[364] Since Hotel REITs have to employ more people than, for example, Industrial REITs, this factor is of greater importance for Hotel REITs.

[361] NAREIT (1999), p. 1.

[362] The RMA contains size limits on a TRS to ensure that a REIT remains focused on core real estate ownership and operations. To ensure that a TRS is subject to an appropriate level of corporate taxation, the amount of debt and rental payments from a TRS to its affiliated REIT will be limited. Further, a 100% excise tax will be imposed to the extent any transaction between a TRS and its affiliated REIT (or that REIT's tenants) is not conducted on an arms' length basis.

[363] Cf. HST (2007), p. 12.

[364] Cf. Ibid., p. 17.

- **Relative attractiveness of properties:** Since Hotel REITs have to renew their properties approx. every seven years, changing consumer preferences and the state-of-the-art of the buildings is crucial for the success of Hotel REITs.
- **Manager dependence:** Hotel REITs depend on the quality of their managers. Opportunistic behavior or insolvency of a manager can seriously affect the competitiveness of a Hotel REIT.
- **Expense increase versus revenue decrease:** Many expenses associated with the operating of a hotel are relatively fixed such as employee wages and insurance, and may exceed inflation in tandem with decreasing room rates.
- **Economic climate and travel patterns:** More than other REIT property types, Hotel REITs are affected immediately and drastically by changes in national, regional, and local economies as well as changes in business and leisure travel.

Also, the results show that the property subtype seems to be more important in the analysis of Hotel REITs than it is for other REIT sectors such as Office. For example, the "full-service" segment does not only have different locations (less prominent in micro but more in metro areas) but also has different drivers in terms of customer base, for example, the share of conference travel is more important. Consequently, the degree of concentration that is based on the geographic exposure is less important because most Hotel REITs are extremely diversified.

5.5.3 Real Estate Investment Strategies and Space Market Cycles of Hotel REITs

The analysis has found different important factors that illustrate the unique dynamics of the Hotel REIT sector. First, the Hotel REIT sector as well as the individual companies are extremely diversified, with a degree of concentration averaging below 0.10 in terms of NCREIF region and MSA. Second, the Top 10 markets differ from the four other REIT property-type sectors because they incorporate typical holiday destinations such as Orlando-Kissimmee (MSA) and Miami-Fort Lauderdale-Pompano Beach (MSA).

Third, nearly all Hotel REITs are represented in every NCREIF region. This illustrates that there is a necessity for Hotel REITs to be represented in all parts of the country. Although this appears to be logical, it has not been demonstrated empirically. The only exceptions are very small REITs such as Suptertel Hospitality that owned an average of

59 properties over the sample period and that operate in the property subtype "limited services." These hotels are mostly located outside the large MSAs that are core to the classification in terms of markets in this analysis. Consequently, most of these hotels are in "micros" such as Hays, Kansas, instead of large metro areas such as Atlanta. In addition, the hotels had an average size of 69 rooms over the study period, which is small. Until 1999, 100% of Supertel Hospitality's properties were outside the 48 MSAs covered individually in this study.[365]

Fourth, Hotel REITs have grown mainly in the large markets. This is based on the fact that the share of "USA (Others)" has decreased from 35% to 20%. This might be because access to the capital markets has enabled Hotel REITs to act in these highly competitive markets that require substantial amounts of capital to invest in. Most significantly, Hotel REITs have increased their holdings in the Pacific region with numerous acquisitions in the Californian markets.

Fifth, the average size of a hotel property owned by a REIT increased from 143 rooms in 1995 to 224 rooms in 2006. This trend is underscored by the change in size of the largest hotel property in the sample that was approx. 400 rooms in 1995 and is approx. 2000 rooms in 2006. Similarly, the smallest hotel property was 23 rooms in 1995 and 35 rooms in 2006.

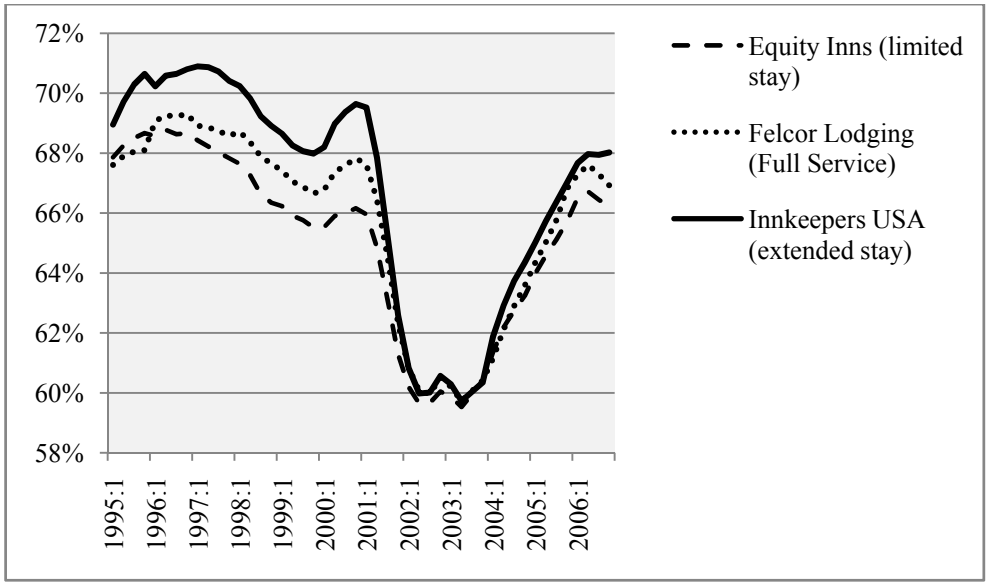
Sixth, the sample is dominated by one large REIT – Host Hotels & Resorts – that owns more than 65,000 rooms, mainly in the upper and luxury segment as of February 23, 2007 (127 hotels). These hotels have, on average, double the size of the industry average. Since Host Hotels & Resorts operate in the "full-service" property subtype with a larger "operating component," size and the corresponding economies of scale may have made size a critical success factor in this subsegment.

Lodging and resort REITs are particularly affected by real estate cycles in the demand for and supply of hotel rooms. Since the demand for hotel rooms depends on the state of the overall economy and local market factors, extended growth periods trigger the supply of new hotels. The long lead-time and development of hotels in comparison to other real estate sectors increases the volatility of the lodging and resort segment.[366] Moreover, the demand for hotel rooms as well as particular regions is even more

[365] This number decreased to 85% in 2006 due to acquisitions mainly in Atlanta (2006) and Dallas (1999).
[366] Cf. CORGEL, J. (2007); BARTL, H./DIBENEDETTO, R. (2003), p. 248.

difficult to predict. Consequently, lodging and resort REITs are in particular affected by GDP development, customer preferences for particular destinations, and external shocks. The illustration below shows that different property subtypes of Hotel REITs are affected by the same overall market trend expressed by the occupancy rates but that occupancy can differ between the different hotel types. Also, the differences seem to decrease during periods of decline and external shocks. Although only minor, Innkeepers USA, which focuses on extended stay properties, had higher occupancy levels than the other two companies.

Figure 135: Occupancy Levels of Hotel REITs – Sub Property Type Examples



Source: SNL REAL ESTATE, PFEFFER.

Since hotel sales are – more than other real estate sectors – affected by seasonality, the volatility of returns is higher than in other sectors. Additionally, the volatility depends on the hotel property type and the regions. For example, HST typically realizes 33% of its revenue in the fourth quarter of the year.[367] As demonstrated, Hotel REITs operate in different property subtypes such as "full service" (e.g., Ashford Hospitality Trust, Inc.), "limited service" (e.g., Hospitality Properties Trust), and "Hotel" (e.g., Highland Hospitality Corporation), and in regional markets these cycles may differ. Hotel REITs constituted approximately 8% of the FTSE NAREIT Equity Index as for July 2007 and are the smallest sectors investigated in this study by market capitalization.[368]

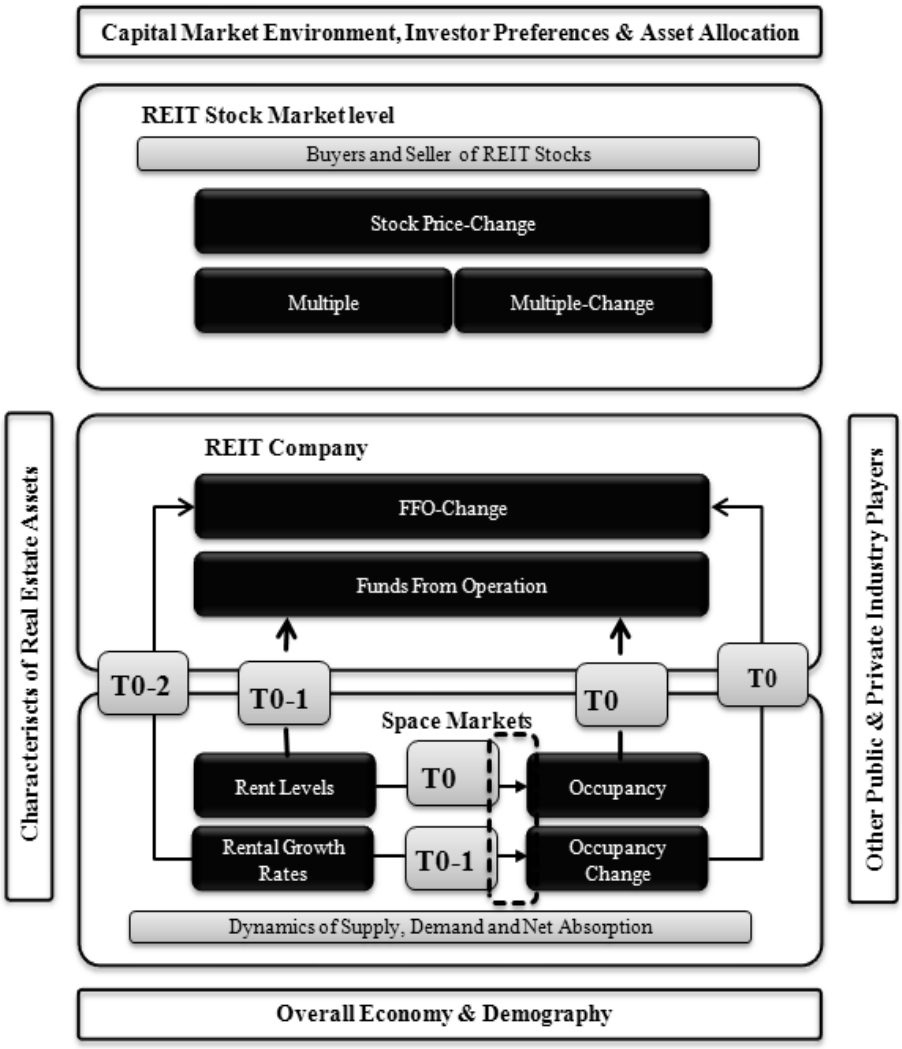
[367] Cf. HST (2006), p. 8.

[368] Refer to Table 2: REIT Sectors and Subsector, p. 42.

5.5.4 Links and Time Lags between Space Markets, FFO, and Pricing of Hotel REITs

Based on the findings, Figure 136 illustrates the results of the CCF /lag analysis and demonstrates the time lags between space market cycles, operating performance, and pricing of REITs.[369] The diagram shows two important facts: Firstly, there are a significant number of positive and rather short time lags between space market cycles and the operating performance of REITs. Secondly, there is not such a relationship between the operating performance of Hotel REITs and their pricing in the capital markets.

Figure 136: REIT-Real Estate System of Hotel REITs



Source: Own compilation.

[369] The illustration is a simplification of the results presented earlier combining the findings of the sector- and company-level analysis.

Furthermore, the Hotel REIT sector is the only sector where rental growth rates tend to lead occupancy change (the sector-level analysis found a lag of one quarter). This illustrates that hotels are able to adjust their rents more quickly than the actual demand for space in hotel changes. Since hotel rooms are priced daily based on demand without any mid- or long-term contracts, investors should follow the changes in hotel room rates as an earlier indicator for the space market conditions.

Also, investors should be aware that a change in the underlying space market directly affects the earnings potential of a REIT. As shown, the longest time lag is two quarters for certain Hotel REIT companies (no time lag on a sector level). This implies that the earnings component of REITs that an investor gets from his or her exposure in this REIT property sector is more difficult to estimate because of the short time lag.

In addition, the analysis does not find any significant bivariate links between space market cycles or earnings of REITs and the pricing of REITs. As a consequence, the diagram does not depict any links in this area. Also, the range in terms of variation from the sector-level results is relatively low, meaning that for most companies the analysis finds a time lag of zero. Having discussed the REIT-Real Estate System of REIT property types, the following chapter analyzes the transferability of the finding to real estate investment trusts in Europe, particularly Germany.

5.6 Implications for Real Estate Investment Trusts in Europe

Having analyzed the link between space markets and REIT earnings and pricing, this section discusses to what extent the findings are transferable to REIT regimes in Europe. To recapitulate, the empirical analysis has investigated the physical market cycle differentiating between 49 space markets in the United States, e.g., Denver. This is in contrast to other studies that are based on a national, regional or state level only. In this way, the analysis is more precise than former studies.[370] Since market cycles of different space markets can vary significantly even within an NCREIF region or state such as California, a detailed analysis contributes to the explanatory power of the study. For example, market cycles within a state such as California, namely San Diego, San Francisco, or San José that are the subject of this analysis, differ.[371] The transferability of the findings depends on the following critical factors:

1. Comparability of space market cycles in Europe, particularly the comparability of property type and market cycles of metro areas,
2. Transferability of REIT earnings and pricing measures applied in the analysis, and the
3. Efficiency and pricing mechanisms of REITs in Europe.

5.6.1 Comparability of Property Type and Metro Market Cycles

The empirical analysis linked space market cycles with the profitability and pricing of REITs on a sector as well as on a company level. It is important to note that the study differentiated between property *types* (five property types) and *space markets* (49 markets) cycles expressed by two market pricing factors (rent/occupancy).[372] This poses the question whether property cycles in the United States are similar to those in Europe.

Investigating similarities and differences between property-type cycles for office, retail, industrial, apartment, and hotel real estate refers to the characteristics of the properties, the dynamics of the respective locations, and the fundamental principles and success factors for each respective property type. Empirical research (mainly in the U.K.) has

[370] Cf. FISHER, J.D. (2005), p. 155; NELSON, T.R./NELSON, S.L. (2003), p. 72.

[371] Cf. MUELLER, G.R. (1993), p. 60.

[372] Cf. PYHRR, S.A., et al. (2003), p. 8.

shown that property-type cycles are similar to cycles in the U.S.[373] Also, the work of WERNECKE/ROTTKE/HOLZMANN (2004) has shown that office real estate cycles in Germany are at least similar to their U.S. counterparts.

Furthermore, the different structure and length of rental contracts between the U.S. and Europe as well as among European countries for the different property types has an impact on the comparability of market cycles. Office rental contracts in the U.K., for example, are often long-term contracts with upward-only rent reviews. In the case of falling rents, the main mechanism for adjustment is tenant relocation, which often implies a breach of lease.[374]

The work of RENAUD (1999), which analyzed global real estate cycles in international markets, shows that although global real estate cycles become more integrated, the intensity of real estate cycles differs among European countries. For example, major policy errors in the U.K. combined with more liberal lending policy played a stimulating role for excessive lending. This contributed to the volatility of the real estate markets in the U.K. This illustrates that different countries are subject to different contract schemes and lengths in different European countries. This has important implications for the time lag between space markets and FFO. The longer the rental contract for a property type, the longer it takes until an increase (or decrease) is factored into FFO. This is in line with the evidence provided in this study, e.g., between hotel real estate, which adapts very fast to rent changes, and office real estate, which has a larger time lag because of the longer contract terms. This stresses the need for a separate analysis of rental schemes for every property type and country to derive meaningful conclusions for a forecast model of space markets and FFO.

Having discussed the importance of property-type cycles, the comparison of space market dynamics in the United States and Europe is more difficult. While the theoretical application of the market pricing factors such as rent and occupancy is less problematic except for the data availability, the comparison of geographic factors on continental, national, regional, and MSA levels is more complex. Until now, there has been no coherent and consistent data available on space market cycles on a European level or MSA level that is comparable to the United States.

[373] Cf. BAUM, A. (1999), p. 103 et seqq.

[374] Cf. DOWNS, G.P. (1999), p. 104.

To sum up, property cycles are similar to the U.S. except for the "country factor" in the E.U. Nonetheless, a property-type specific analysis is critical because the fundamental factors that determine the property cycle vary among different subsectors in Europe as well as in the U.S.

5.6.2 Transferability of the FFO Concept to REITs in the European Union

The study used Funds from Operation (FFO) as an earnings proxy for the profitability of U.S. REITs. The metric aims to show the earnings power in terms of cash flow from real estate. The concept of FFO was defined by NAREIT in 1991 and was established as an industry standard to analyze the historical and prospective profitability and value of REITs.[375] The FFO metric was re-evaluated and modified in 1995, 1999, and 2001 to create a uniform benchmark for the operating performance of a REIT.[376] It adjusts net operation income as a starting point by gains/losses from sales of properties plus depreciation and amortization among others to provide a measure of stabilized cash flow from operations, not as a measure for dividend paying capacity.

At this, the concept of FFO (and similarly AFFO) and FFO multiples (the inverse of the Price/FFO measure) as a measure of relative market value have evolved and are key figures for valuing REITs in the U.S. This poses the question whether or to what extent the concept of FFO is transferable to and convergent with REITs in Europe. The calculation of FFO for U.S. REITs is based on U.S. Generally Accepted Accounting Principles (GAAP), not International Financial Reporting Standards (IFRS), as required for REITs in Europe.[377] Although the European Real Estate Association (EPRA) and NAREIT have published best practices and worked on convergence between the two accounting standards together with the Financial Accounting Standard Board (FASB) and the International Accounting Standards Board (IASB), there are still significant differences.

[375] Refer to Chapter 2.3, p. 40.

[376] Cf. YUNGMANN, G./TAUBE, D. (2001), p. 2.

[377] Cf. IASB (2008), no page.

One important difference is that investment properties can be balanced at their fair value.[378] This has important implications for the concept of FFO because investment properties are then reported at fair value not costs (in this case the fair value has to be included in the notes to a statement). Consequently, there would be no regular depreciation relative to the book value that is comparable to U.S. GAAP. In contrast to U.S. REITs, which reverse out depreciation when calculating FFO, REITs that report their properties at fair value in line with IFRS have to apply a different or adjusted concept. This implies that REITs in the E.U. cannot or do not need to apply the concept of FFO to the same extent as their U.S. counterparts. On the opposite side, book value under U.S. GAAP is not an important or meaningful figure for the value of the properties. To sum up, the allowance of fair value according to IFRS takes away depreciation and limits the application of the concept of FFO for REITs in the E.U.[379]

5.6.3 Comparability of REIT Capital Markets Environment

The analysis has shown significant links as well as time lags, between space markets, the profitability, and seldom the pricing of REITs in the capital markets, particularly on the sector level. Transferring the findings to European countries requires a comparison of real estate capital markets and their environment, for example, analyst coverage and transparency.

The study by WANG/ERICKSON/CHAN (1995) conducted in 1995 shows the necessity of analyst coverage for the growth of the REIT industry. Without an accurate and fair valuation of real estate in the capital markets, anomalous performance of the REIT stock market is more likely.[380] Since the analyst coverage of REITs, for example, in Germany, is still not comparable to that in the United States, it is less likely that the stock market will price in changes in the underlying space markets as quickly as in the United States.

Furthermore, this implies that due to the lower level of monitoring activities, pricing mechanisms and information dissemination, the pricing of German REITs is more likely to follow investor sentiment than the rational of the underlying real estate markets.

[378] Cf. Ibid., no page; OWUSU-ANSAH, S./YEOH, J. (2006), p. 229. Although there is a option to balance investment properties either at "fair value" or "Fortgeführte Anschaffungs- und Herstellungskosten", the "fair value" still has to be reported in the notes in the latter case (IAS 40).

[379] Cf. STRIBLING, D. (2007), no page.

[380] Cf. WANG, K./ERICKSON, J./CHAN, S.H. (1995), p. 450.

Since investor sentiment is less predictable and more "emotional,"[381] this might cause more volatility, especially in the first years of the development of a REIT industry in Europe.

Nonetheless, the study conducted by KLEIMAN/PAYNE/SAHU (2002) conducted tests on the random walk hypothesis for international commercial real estate markets for three regions, namely Asia, Europe, and the United States. Their research provides evidence that supports the random-walk hypothesis in the European and United States listed real estate markets applying Dicky-Fuller and Philips-Perron tests.[382] This means that investors can derive benefits from diversification only in the short run and not in the long run.

Interpreting the results of the study, it can be concluded that REIT stock markets are fairly efficient and transparent in the United States because they price in changes in the underlying space markets in most cases prompt and correctly at least on a sector level. Since REIT markets in Europe, including Germany, do not have the same degree of transparency, the application of the findings of the analysis is limited.[383] Nonetheless, the maturation of REITs in Europe has increased significantly during the last few years and will contribute to the findings of this study in the future. This poses the necessity of further research on the effect of transparency and corporate governance of listed real estate in Europe.[384]

5.6.4 Section Summary

Based on the findings, it is concluded that the basic links between space market cycles, FFO as a proxy for the earnings, and pricing of REITs found (or not found) in the analysis are likely to be transferable to European REIT regimes, for example, Germany, with certain restrictions. The factors that support this opinion are as follows:

- The existence of physical market cycles in Europe on city, state, regional, and country levels.

[381] Cf. BUTTIMER, R.J./HYLAND, D.C./SANDERS, A.B. (2005), p. 51.

[382] Cf. KLEIMAN, R.T./PAYNE, J.E./SAHU, A.P. (2002), p. 293.

[383] Cf. PFEFFER, T. (2007), p. 230; SCHULTE, K.-W./ROTTKE, N./PITSCHKE, C. (2005), p. 90 et seqq.

[384] Cf. KOHL, N. (2008), no page.

- The growth of the listed real estate segment in Europe, including the growing capital market environment of REIT, for example, in terms of analyst coverage.
- The basic conformity and similarity of the regulatory framework of REITs particularly in terms of distribution requirements and the calculation of FFO and the pricing mechanisms of REITs in the capital markets.
- The maturation and increasing transparency of real estate (capital markets) in Europe and market research on space and real estate asset markets.
- The increasing convergence of U.S. GAAP and IFRS in terms of the valuation of investment properties.

On the other hand, differences that have to be taken in consideration arise from the following:

- "Country factor" in Europe in terms of market selection and diversification.
- Particularities of national REIT regimes, e.g., quarterly reporting, distribution requirements or the calculation of FFO.
- Varying rental contract terms especially length of the contract obligation, for example, for industrial real estate.
- Development stage of real estate capital markets in Europe, especially REIT analyst coverage, transparency standards, and number of companies.
- Availability of detailed, coherent, complete market cycle data for property types and markets as provided by PPR (2007a) in the U.S. as well as on property holdings, company information, and accounting of REITs as offered by SNL (2007b).
- The increasing internationalization in terms of a larger share of foreign properties held.

Nonetheless, the evidence provided in this study supports the conclusion that the fundamental principles governing the links and time lags found should be transferable to European REIT regimes.[385]

[385] Refer to BONE-WINKEL/PFEFFER (2008B), SCHÄFERS/KOHL/SCHULTE (2008c) and SCHÄFERS ET AL. (2008b) for more information on G-REITs.

6 Conclusion and Outlook

6.1 Summary

The research objective of this study was to investigate theoretically and empirically the complex relationship and time lags between the space market (cycles) in terms of occupancy and rent factors (absolute and relative), the operating performance on a firm level (FFO), and the pricing of REITs in the stock market (FFO multiples and stock price change) on sector and company levels under consideration of the exact property holdings of REITs in 49 markets, five property types and for each of the 48 quarters that form part of the study period (1995:1 to 2006:4).[386]

In this way, the dissertation has investigated the research questions and tested the hypotheses for the five largest REIT property-type sectors (Office, Industrial, Retail, Apartment, and Hotel) and 131 historic and current companies from these sectors that constitute approximately 75% of the overall Equity REIT spectrum, excluding only Healthcare, Self-storage, Diversified, and Specialty REITs.

Drawing on the results of the theoretical and empirical examination, the overall conclusion must be that investors in and analysts of REITs should consider space market cycle analysis under consideration of the specific time lags, which differ for each REIT property-type sector, and include the findings in their decision-making process.

Due to the complexity of the analysis, the various steps, and the multiple variables involved, the generalized thesis statement can be further specified following the hypotheses that are based on the research questions. Therefore, the following paragraphs present the results of the respective sections of the study and give an overview of the various hypotheses. If there is evidence supporting the alternative hypotheses H_A, investors could make better investment decisions by analyzing the market cycles for the respective property types and metro areas a REIT is invested in.[387]

[386] The 49 markets consist of the 48 largest metro areas in the U.S. from Atlanta to Washington and one category USA (Others) that subsumes smaller metropolitan and micropolitan statistical areas. Foreign properties (<0.6% on average) and non-core properties (<5% on average) were excluded.

[387] If the null hypothesis is refuted, the alternate hypothesis (or maintained) hypothesis (denoted as H_A) is supported. Please note that all statistical testing is carried out on the null hypothesis. Consequently, the statistical analysis will either reject or fail to reject the null hypothesis (accepting the null hypothesis would mean that there is not enough evidence to claim that the null hypothesis is incorrect.

The generalized full variable hypothesis or thesis statement is that space market (cycles) have a significant predictive power to explain the operating performance (FFO) and/or pricing in the stock market. Also, the effect of operating performance (FFO) on pricing is investigated.[388] Precisely, the following paragraphs summarize the findings that are in the following areas:

1. Results of the Fundamental Analysis
2. Results of the Analysis of Operating Performance and Pricing of REITs
3. Characteristics and Developments of Space Markets
4. Real Estate Investment Strategies of REITs
5. Space Market Performance and Cycles of REITs
6. Cross-correlation and Time Lags of Space Market, FFO, and Pricing Factors
7. Regression Analysis of REIT Sectors (Space Markets, Economic Indicators as Predictors)

1 Results of the Fundamental Analysis

Starting with the fundamental analysis, the findings show that Equity REIT property-type sectors are diverse and change over time by means of key fundamental ratios. Although REIT property-type sectors follow an overall "Equity REIT trend," the sectors are different, for example, in terms of their growth by market capitalization or real estate investment growth, as shown in chapter 4.1.

Second, REIT property types differ in the degree of leverage, meaning that Hotel REITs (39% leverage) cannot afford the same ratio of total debt to total market cap as Apartment REITs (46%), for example.[389] This indicates that the stock market requires a more conservative leverage ratio from more volatile REIT property-type sectors such as Hotel, which is the most volatile sector.[390]

[388] The corresponding H_0-Hypothesis would be that space market cycles have no significant predictive power to explain the performance of REITs. Failing to reject the null hypothesis means that REIT performance is not primarily determined by space market fundamentals but by other factors for example by an overall stock market factor or capital flow to and out of REIT stocks.

[389] Defined as a percentage of "Common Capitalization" + "Total Preferred Equity" + "Total Debt" + "Mezzanine" – "Minority Interest" and measured as the long-term average over the study period.

[390] "Volatility" refers to the space market fundamentals in terms of rent and occupancy as well as stock price changes.

Third, REIT property sectors do not share the same ratio of gross real estate investment to total assets. While investors in Apartment REITs have a "real estate exposure" of 87%, Regional Mall REITs have a real estate exposure of only 79% on average because of the higher operating component.[391] Nonetheless, the fundamental analysis has shown that the real estate exposure of REITs is drastically higher than for Real Estate Operating Companies (53% for Hotel and 59% Other REOCs). Consequently, investors get a higher "real estate type return" when investing in REITs compared to REOCs.

Fourth, the analysis of real estate investment growth has shown that the study period can be split into two growth phases (very high growth until the end of the New REIT era in 1999) and moderate growth subsequently. Also, it was shown that REIT property sectors were not able to grow their asset base in the same year and not necessarily all property sectors. For example, only Retail REITs were able to significantly grow their asset base in 2004, Industrial REITs in 2005, and Hotel REITs in 2006.

Fifth, the investigation of FFO growth has shown that it follows real estate investment growth as one of the most important drivers of FFO growth.[392] At this, investment growth accounts for around 75% of FFO growth, illustrating the importance of external growth strategies for REITs. Other factors that influence FFO growth are the capital structure or internal growth strategies, for example, revenue from services to tenants.

Sixth, the examination of FFO to revenue has demonstrated that Office, Industrial, Retail, and Apartment REITs are more stable in terms of this ratio than Hotel REIT and other REIT property-type sectors. This illustrates that the four "traditional" REIT property sectors are less volatile in terms of revenue and FFO based on the characteristics and tenant structure of the respective property type.

2 Earnings and Pricing of Real Estate Investment Trusts

Analyzing the relative pricing of REIT sectors by their FFO multiples, the analysis has brought out several insights in chapter 4.1. First, REIT property-type sectors do not trade at the same multiples in the long term. This means that compared to the long-term

[391] Assets besides investment properties can be investments in unconsolidated entities as equity, cash, tenant receivables or other assets.

[392] REITs can increase FFO (among other internal and external growth strategies) by buying properties, portfolios of properties or other REITs that have a higher return than their capital costs. These activities are part of the external growth strategies.

average FFO multiple of 13x for Equity REITs, Apartment and Office REITs trade at higher multiples (13.5x) compared to the Hotel REIT sector (10x), for example.

Investigating the development of FFO change (earnings proxy) and stock price change (pricing proxy) over the study period for each of the five REIT property sectors, the findings demonstrate that the earnings change is less uniform among REIT property-type sectors than the price change. Consequently, if investors divest from REITs, they typically divest from most REIT sectors although the earnings development by FFO may be different for each of these sectors. This illustrates that FFO is driven by fundamentals that are often different for property sectors, but pricing by factors not related to the space market fundamentals but other aspects such as investor sentiment ("like or dislike REITs").

Furthermore, the company-level analysis of FFO growth expectations in relation to the pricing of REITs suggests that the overall pricing of REIT by their earnings potential is rational, meaning that a higher expected FFO growth results in a higher FFO multiple.[393] Nonetheless, the large differences from the regression line for individual REIT companies illustrate that the pricing is not entirely based on the earnings expectations of a REIT. As a consequence, there must be other idiosyncratic factors specific to the company, which cause the stock market to value the company at a premium or discount.

3 Characteristics and Development of Space Markets

Investigating the dynamics of space market for the five different property types, the results show that investors can cover around 75% of the relevant space markets when tracking the 15 largest markets. For example, the 15 largest markets in the Office REIT sector represent 80% of the relevant markets for this property type.

Furthermore, the analysis shows that investors have to track different space markets depending on the property type. While New York represents approx. 14% for the office segment, the importance for the Apartment segment is only minor, with less than 2%.

[393] The Gordon Dividend Growth Model determines the intrinsic value of a stock (in this case a REIT stock), based on a future series of dividends (here expressed as the FFO growth estimate) that grows at a constant rate. Given a dividend per share that is payable in one year (assuming that the dividend grows at a constant rate in perpetuity, the model solves for the present value of the infinite series of future dividends. Refer to Chapter 2 for a detailed description.

Similarly, Orlando, and Miami belong to the Top 10 Hotel REIT markets but are not a significant market for the other four property types and so forth.

In addition, space markets are not stable over time but have different growth dynamics depending on the underlying economic and demographic factors. For example, Las Vegas was the fastest-growing office market in terms of average yearly increase in percentage of stock, growing at 7.9% per year. Other more supply-constrained markets such as New York or Boston grew at a percentage of 0.7% per year.

Furthermore, the analysis of net absorption shows that investors should be aware of the different volatility of the underlying property sectors they invest in. This means that investors in Hotel REITs invest in the most volatile property type, Office and Retail REIT investors in a sector with moderate to high volatility in terms of net absorption and in a sector with a very stable base when investing in industrial or apartment real estate. Moreover, the seasonal component implied when investing in hotel real estate is shown. These factors are important because they are reflected in the (in terms of height and variance) rent and occupancy level of the respective sector that lays the foundation for FFO growth.

4 Real Estate Investment Strategies

Analyzing the real estate investment on a sector level illustrates the different strategies of REIT property-type sectors in terms of NCREIF and metro areas. For example, Office REITs have successfully over-weighted the Pacific and North-East NCREIF regions with higher rental growth rates. Another important investment strategy is the trend from smaller metro and micro areas (subsumed under “USA (Others)”) to larger metro areas in the NCREIF regions for the Hotel REIT sector (42% to 25%) as described in greater detail in chapter 4.4. Apparently, the findings are even more different on a metro-area level.

H_1 Real Estate Investment Growth and Diversification[394]

In terms of the relationship between growth of the asset base and the degree of concentration, the analysis finds mixed results depending on the company and the sector. Precisely, the Industrial REIT sector has kept the same degree of concentration

[394] Refer to Chapter **Error! Reference source not found.**, p. 37 for a specification of the hypotheses.

over the study period (by NCREIF region and by metro area) while the Retail, Hotel, and Apartment REIT sectors have become more diversified with increasing size. In contrast, the Office REIT sector has become more focused on an NCREIF regional level and has kept at a relatively constant level on a metro-area level for the REIT sector-level analysis. Similarly on a company level, there are a number of Office REITs that have chosen to become more focused, in particular by NCREIF region, focusing on multiple markets in one or two NCREIF regions. In this way, the Office REIT sector is different from the other sectors as described in chapter 4.1 and 4.2.

H_2 Real Estate Investment Growth and Diversification

Also, the analysis has shown that there is evidence to support the hypothesis that "the larger the size of a REIT, the larger the size of the individual assets" holds true for some but not all REIT sectors. For example, this holds true for the Industrial and Hotel REIT sectors but not for the Retail and Apartment REIT sectors. Moreover, Office REITs reveal a mixed picture, finding evidence to support the alternate hypothesis until 2001 but not for the period afterwards.[395]

5 Space Market (Out)Performance of Real Estate Investment Trusts

This section questioned whether REITs (or management teams of REITs) were able to successfully targeted (on a aggregated sector-level) metro areas with higher rental growth rates and occupancy levels. Outperformance in this context can only arise from the ability to invest in local space markets with higher rental and occupancy change and by divesting from underperforming markets. Taking into consideration the long time frame of the analysis and the large number of properties, this is relatively difficult. Furthermore, outperformance in this analysis cannot arise from factors related to building qualities or micro location. Also, outperformance cannot arise from the aspect that REITs are invested to a larger extent in the large metro areas such as New York with high rent levels because the properties not located in one of the 48 markets (covered individually in this study) are combined with the weighted average of the 48 markets (for each quarter of the analysis). In this way, the outperformance can only arise from superior market timing and selection abilities. Since the analysis covers at

[395] Refer to chapter 4, p. 169 for more details and chapter 5, p. 259 for a discussion of the findings.

least 95% of all relevant REITs and approx. 95% of all property holdings, the results have a high explanatory power.

H_3 Space Market Cycle Outperformance of REITs

In this light, the analysis has empirically proved that most REIT property sectors were able to achieve higher or equal rent and occupancy levels than the overall market by space market selection and timing. Also, it is shown that REITs follow the overall market trend in terms of occupancy and rent but typically at a higher level. This is a very important finding that has not been shown before, and it verifies or contributes to the understanding why REITs have outperformed not only from a risk/return standpoint but also from a "real estate performance" standpoint.

Consequently, the REITs or the management teams of REITs were continuously able to outperform the market, a result that is a unique selling point for this industry. Therefore, the REITs must have been able to attract some of the most professional and skilled managers during this particular time frame. Also, the analysis demonstrates the large differences in terms of space market performance of individual companies within a sector. Although nearly all companies within a sector follow the overall REIT property sector trend, the differences can be significant. Furthermore, it shows that investors in REITs get a "real estate" exposure via the income return of REITs that follows the overall market trend but on a higher level.

6 Cross-correlation and Time Lags between Space Markets, Earnings, and Pricing Factors of Real Estate Investment Trusts

H_4 Relationship between Occupancy and Rents

Having analyzed the relationship between occupancy and rents of REITs, the findings suggest that occupancy is an earlier indicator in terms of turning points of space markets than rents (vice versa for Hotel REITs). This might be related to the fact that "space" can be rented out faster in case of increased demand, given that there is space available. In contrast, during an economic downturn, companies seem to stop renting new space (from REITs) immediately but have to fulfill their contractual obligations even when moving out of the premises.

H_5 Relationship between Growth Rates and Levels of Rent and Occupancy

Investigating the relationship between space market factors with the aim to find significant associations/time lags, the analysis finds evidence for all five REIT property sectors to refute H_o and support H_5 that space market growth rates (of REITs) are an earlier indicator of changing space market conditions. For example, when growth rates are slowing and turning from increasing to decreasing, rent *levels* are still increasing as long as growth rates are still positive. As shown, occupancy change is the lead variable for rental growth rates with a different quarterly lag with the exception of the Hotel REIT sector, where rental growth rates lead occupancy change.[396] In this way, the lag between occupancy change and rental growth rates for the four "traditional" sectors is four quarters for Office, Industrial, and Apartment REITs and two quarters for Retail REITs. This is an important finding because it contributes to the understanding of space market dynamics (of REITs) that can contribute to better investment decisions and forecasts. Also, rental growth rates lead occupancy *levels* for all five sectors, as shown in more detail in 0. Also, the analysis finds numerous significant links between occupancy levels as the lead variable for rental levels with up to seven quarters for Office REITs as the maximum time lag because of the long rental contracts in the office sectors, as presented in chapter 4.6.1.

H_6 Space Market Factors with Funds from Operation

Also, the analysis finds various significant links on REIT property sector and company levels that refute H_{05} and evidence to support that there is a significant positive relationship between occupancy and rent factors (levels and growth rates), on the one hand, and the earnings of REITs measured by FFO (levels and growth rates), on the other hand.

Looking at the interplay between space market factors and Funds from Operation, the analysis differentiates between four different bivariate links: rent change with FFO change, occupancy change with FFO change, rent with FFO levels, and occupancy with FFO levels. In addition to the rent change and occupancy change with FFO change for the Retail REIT sector, which might be biased by the property subtypes of retail real

[396] Refer to Chapter 4.6.1, p. 226 for an explanation and page 245 for a discussion of the results.

estate (regional malls, shopping centers, and other retail elements such as outlet malls), the analysis finds various significant links/time lags.

The largest time lags are found for the Office REIT sector. For example, the analysis finds evidence of a lag of three quarters between rent change and FFO change for Office REITs. This means that a change in the average weighted rent levels of a REIT of 5% in 2008:Q1 (based on the exact property holdings by square foot in the different space markets) is reflected in a corresponding FFO change three quarters later (highest significant coefficient). It is important to note that the change in rents does not represent the *actual* rents of a REIT but the weighted rents *in the space market* the REIT is invested and that are external to a REIT.

Furthermore, the analysis finds that the cross-correlation for rent levels with FFO is always the highest at a lag of zero for all five sectors. This is an important result, which has not been proved before and is not necessarily the same for the link between occupancy levels and FFO levels. Moreover, the link and dynamics between sectors as shown for the sector with the longest lags (Office REITs) and Hotel REITs as the sector with the shortest lags are drastically different, demonstrating the need for a REIT property-type level analysis.

H_7 Space Market Factors with the Pricing of REITs

In contrast to the other links analyzed for the five REIT property types and corresponding companies, the analysis does not find enough evidence to refute the H_0 hypothesis. As a consequence, there seems to be no significant positive relationship between occupancy and rent factors (levels and growth rates) and the pricing component of REITs measured by stock price change and FFO multiple (change). Although this analysis aims at finding significant links, the finding that there is no evidence for bivariate links by the CCF analysis is a valuable result. As shown in the preceding chapter, the “irrationality” of the stock market in terms of not valuing REIT stocks by their space market fundamentals is an essential insight.

H_8 Funds from Operation with the Pricing of REITs

Comparable to the preceding hypothesis, the CCF analysis does not find significant evidence to refute H_{A8}. Consequently, there is no significant positive relationship between FFO (change) and the pricing of REITs measured by stock price change and FFO multiple (change). Because the stock price change or FFO multiple (change) is not in line with the earnings development as shown in chapter 4, the statistical significance is weak, not finding significant cross-correlations between FFO and pricing. Again this implies that there are other factors that drive the pricing of REITs in the short- and mid-term.

7 Regression Analysis

The regression models for the REIT property sectors support the results of the CCF analysis suggesting that lagged space market factors of REITs, which are based on the underlying assets, can clearly explain the earnings (change) by means of Funds from Operation of REITs. At this, the respective time lags are different for every REIT property type sectors. Also, growth rates are an earlier indicator for a change in the operating performance of a REIT.

Furthermore, the regression analysis included different macroeconomic control factors such as the three-month T-bill rate, consumer confidence, Housing Market Index, personal income, population, employment of nonfarm industries, consumer price index, and 10-year Treasury bond rate (all factors referring to the U.S.). In this way, the analysis shows that these factors differ in their importance for REIT property-type sectors. For example, change in population is the most important macroeconomic predictor for Apartment REITs while the change in consumer confidence is crucial for Hotel REITs. Consequently, investors should combine the (lagged) space market factors with economic indicators to predict REIT profitability.

Although the analysis tested the same model with stock price change as the dependent variable and found meaningful results in terms of R square, the coefficients of the space market factors were negative. This implies that the stock market has not priced REITs based on the space market fundamentals most of the time. This is irrational because the REITs should have been priced in improving space market conditions and increased

earnings expectations. Nonetheless, analysts of and investors in REITs of this property type should track space market cycles and earnings to predict the income return of REITs. Furthermore, the analysis has shown that the pricing of REITs is irrational only in the short- or mid-term, not in the long-term. This means that the pricing of REITs in terms of FFO multiples (relative pricing) follows earnings and space market factors in the long-term. As a consequence, the REIT stock market should be appealing to hedge fund investors or long-term value investors.

Transferability of Results to other Real Estate Investment Vehicles

The fundamental links or time-lags found for the different property types between the space markets on the one hand and the earnings of REITs on the other hand should be applicable to other real estate vehicles. This means that − based on the assumption that other real estate investment vehicles have equal, or at least similar, asset management capabilities – the results are important for other listed, as well as unlisted, real estate investment vehicles. For example, a REOC active in the management and ownership of office properties benefits from improving space market fundamentals in the same way as a REIT with a similar time-lag depending on the exposure to different space markets. Consequently, investors in other vehicles should include the time-lags found in their decision-making processes. Since all listed and unlisted vehicles invest in different property types and local space markets with similar lease durations based on the state of the corresponding market and cycle position,[397] the effect on the income component should be comparable.

Nonetheless, investors have to track the property holdings of the corresponding vehicles. Since REITs are relatively transparent for this data as a result of their quarterly filings to the SEC, it might be more difficult to follow this information for other vehicles. Also, REITs have a higher relative real estate exposure than other vehicles such as REOCs, as shown earlier. Therefore, their income cycle is more likely to reflect the underlying real estate space markets. Also, the results of the dissertation should be

[397] Cf. Figure 13, p. 59.

applicable to REITs in the European Union, as discussed in chapter 5.6 under consideration of the differences between IAS and US-GAAP.[398]

Conclusion

To conclude, the result of the investigation is that the generalized thesis statement in terms of a significant association/time lag with space market (cycles) holds true for the income return or earnings component of REITs (FFO), which accounts for around 40% of the overall performance of REITs in the long-term under consideration of quarterly time lags that are different among REIT property-type sectors.[399] In terms of significant links/time lags between space market cycles and/or the earnings of REITs on the one hand and the pricing of REITs in terms of FFO multiple (change) and stock price change on the other hand, there is no or only weak evidence for a "rational" pricing based on the space market fundamentals in the short- or mid-term.

These results have important implications for different types of investors. Since the stock pricing of REITs by their earnings and space market fundamentals is often irrational in the short- or mid-term but not in the long-term, investors such as hedge fund managers could track the space market and earnings development of REITs under consideration of the time lags found in the dissertation and benefit from the temporal pricing discrepancies by investing in undervalued REIT property sectors and companies.

Furthermore, the findings are important for core or core plus investors, which are more risk averse and have a mid- to long-term investment horizon. For example, the analysis has demonstrated that certain REIT property sectors such as Hotel REITs are more volatile in terms of their earnings development (FFO) that is based on the development in the space markets. Also, the analysis has shown that space market characteristics clearly have a significant forecasting ability for the earnings of REITs by including the sector-specific time lags. In this way, investors looking for high, stable dividends can prognosticate the future earnings potential of a REIT by following the space markets a REIT is invested in and weighting it with the exposure by markets.

[398] Cf. Chapter 5.6.4, p. 300.

[399] Refer to Figure 1: Private versus Public Real Estate Pricing – Return Components, p. 4.

From a management perspective, REIT companies should use space market cycle analysis to determine their competitive position in the space market and base their leasing and acquisition strategy thereon to stabilize FFO and determine future improvement programs.

6.2 Limitations of the Study and Critical Reflection

Based on the premises, the sample characteristics, and the methodology applied, the analysis contains certain limitations that are presented in the following paragraphs. The study does not suffer from survivorship bias, which is one major issue in virtually all time series analyses.[400] Survivorship bias means that, for example, the performance over time is pictured as too positive because well-performing funds are more likely to survive.[401] Because a great deal of the previous empirical work on REIT performance used data on survivor REITs,[402] the comparability of the findings is often limited. In contrast, this study covers at least 95% of all property holdings over the complete study period of 12 years, excluding only foreign properties (0.5%), and more than 95% of U.S. REITs from the relevant market and complete space market data for every quarter of the 56 most important markets from PPR (2007a).

Property Type Subsectors

Based on the characteristics of the market cycle data from PPR (2007a), the analysis does not differentiate between subsector property types. For example, the analysis does not differentiate whether an office property is used as a common office building or research the type of office building. Similarly, the study cannot differentiate between retail subsectors such as regional malls or shopping center rents on a space market level. Nonetheless, the space market data on the different markets and property for every quarter is an adequate measure of the dynamics of a particular location and property type.

[400] Cf. DROMS/ WALKER (2001), p. 237.

[401] Cf. RIEPE/ SWERBENSKI (2005), p. 22; HALLAHAN/ FAFF (2001), p. 119.

[402] Cf. OTT/ RIDDIOUGH/ YI (2005), p. 215.

Foreign Property

The analysis excludes foreign property holdings of REIT over the sample period. The foreign property holdings of REITs are divided into property holdings in Canada and other countries. Since detailed quarterly space market data is not available for all five property types over the sample period 1995 to 2006 and the respective countries, it is difficult to factor in the effect of foreign property. Nonetheless, the study has analyzed the share of foreign property holdings of REITs for every year and found that the average share of foreign property is approx. 0.5%. Thus, only one sector – Industrial REITs – had an average share higher than 1%. Even the share of foreign property including Canada and other countries was only 3.6%. Nonetheless, the share of foreign property in this sector derives from the period 2002 to 2006, when Industrial REITs expanded to other countries. Since these property holdings increased from 6% in 2002 to 13% in 2006, the positive performance of foreign properties, and due to the weakening of the exchange rate of the dollar, these asset holdings might weaken the link between space markets and the pricing of Industrial REITs in this study. Since the space market fundamentals of foreign properties are not factored in, their effect on the performance of REITs cannot be determined. This can help explain why the empirical results of the analysis for Industrial REITs are weaker compared to the results of the other four sectors.

USA Other Markets

In addition, the analysis summarizes the properties that are not part of one of the 56 space markets covered by PPR (2007a) in a separate category, "USA (Others)." The 56 markets covered by PPR (2007a) belong to the largest and most important space markets in the United States. The markets not covered separately by PPR (2007a) are MSAs that do not have the critical size to be covered individually in most cases and are mainly "C" (sometimes "B") markets in terms of their importance as locations for commercial real estate. Nonetheless, the asset holdings of REITs in these locations can be quite significant for regional malls or apartments. Since these property holdings are combined with the national average rent and occupancy data that includes the "A" and "B" markets, the explanatory power can be limited. Based on the problems associated with combining "USA Others" with the national average market cycle data, it is more likely

that the performance in terms of space markets selection is even better than shown in the analysis.

Diversified and Specialty REITs

In line with the research objective, the study does not include diversified and specialty REITs, e.g., Prison, Self-storage, and Healthcare REITs. Based on NAREIT (2008d), the share of diversified REITs is only 6.5% of all Equity REITs.[403] Adding up the share of Diversified REITs, Self-storage REITs (5.9%), Healthcare REITs (8.7%), and Specialty REITs (5.9%) equals a total share of 26.9%. These sectors are not included in the sample. The bottleneck is the availability of detailed space market data on rents and occupancy data for all 56 space markets for every quarter for self-storage, healthcare, and specialty real estate. Nonetheless, the study represents 75% of the U.S. Equity REIT universe and the five largest Equity REIT sectors.

6.3 Research Perspectives and Outlook

Further research perspectives arise by including other factors such as property selection within a market and the effect of building quality to spot the key performance drivers of REITs in terms of their "real estate performance." Such an investigation could also focus on the differences between different REIT companies of one sector as well as differences between REITs and other players to assess the quality and success of different management strategies. Moreover, a coherent model of property factors that determines cash flows from real estate on a REIT level is needed.

Furthermore, a combined study of the link between capital flows to REITs and external shocks is needed in order to determine and explain periods during which profitability and pricing of REITs move in different directions. In this context, research is needed to assess whether, and if yes, to what extent an increasing transparency of listed REITs has contributed to the pricing of listed real estate based on the underlying real estate markets REITs operate in.

[403] Cf. NAREIT (2008d), no page.

Also, the results of the analysis do not take into consideration intra-city or international differences. Furthermore, the explanatory power could be further increased by including more space markets and reducing the share of the category "USA Others" that was used to cover the markets that are not part of the 48 markets covered individually in this analysis. Moreover, other property types such as healthcare and self-storage that represent about 14% of the U.S. Equity REITs segment could be included. This would then cover practically the whole REIT industry, excluding Mortgage and Hybrid REITs.

In addition, the applicability of the findings with regard to other real estate investment vehicles has not been solved. Due to the different regulatory framework and concepts, more empirical research is needed to test the impact of space market dynamics on the performance of real estate. The difference between Real Estate Investment Trusts and Real Estate Operating Companies could contribute to a better understanding of the effect of the REIT concept and pricing mechanisms.

This study has dealt with only a small portion of the factors that determine the performance of REITs. Due to the dynamic development of the market for indirect real estate investment, especially in Europe through the introduction of REITs in Germany, more research has to be conducted on indirect investment vehicles in real estate, their performance characteristics, and the role of real estate fundamentals, as the main spur for future markets.

References

ADAMS III, A. FRANK/ JACKSON, JOHN D./ COOK, J. PHILIP (2001): "Capital Market Theory and Real Estate Valuation: A Case Study in Choosing an 'Appropriate' Discount Rate." in Journal of Forensic Economics, Vol.14(2), p. 119.

AEC (2008): "About AEC." retrieved February 18, 2008, from http//www.aecrealty.com/.

AMBROSE, BRENT W. (1990): "An Analysis of the Factors Affecting Light Industrial Property Valuation." in Journal of Real Estate Research, Vol.5, p. 355-70.

AMBROSE, BRENT W./ ANCEL, ESTHER/ GRIFFITHS, MARK D. (1992): "The Fractal Structure of Real Estate Investment Trust Returns: The Search for Evidence of Market Segmentation and Nonlinear Dependency." in Journal of the American Real Estate & Urban Economics Association, Vol.20(1), p. 25-54.

AMBROSE, BRENT W./ HIGHFIELD, MICHAEL J./ LINNEMAN, PETER D. (2005): "Real Estate and Economies of Scale: The Case of REITs." in Real Estate Economics, Vol.33(2), p. 323-350.

ANDERSON, RANDY et al. (2005): "REIT Returns and Pricing: The Small Cap Value Stock Factor." in Journal of Property Research, Vol.22(4), p. 267-286.

ANDERSON, RANDY I. et al. (2002): "Technical efficiency and economies of scale: A non-parametric analysis of REIT operating efficiency." in European Journal of Operational Research, Vol.139(3), p. 598-612.

ANIKEEFF, MICHAEL A. et al. (2007): "Healthcare Real Estate: Excess Capacity and Growing Costs." in Journal of Real Estate Literature, Vol.15(3), p. 355-382.

ANONYMOUS (1997): "Hotel REITs: Up from nowhere." in Cornell Hotel & Restaurant Administration Quarterly, Vol.38(5), p. 10.

ANONYMOUS (2001a): "Office Rents Decrease Sharply." New York Times.

ANONYMOUS (2001b): "Scared Travelers Take a Toll on Performance of Lodgings REITs." in National Mortgage News, Vol.26(10), p. 14.

ANONYMOUS (2002a): "Apartments in LA Face 'Bubble' Risk." in National Mortgage News, Vol.27(6), p. 30.

ANONYMOUS (2002b): "Sharpe/Treynor Performance Attribution Model: A Practitioner's Approach to Using the Sharpe and Treynor Reward to Risk Ratios." in Journal of Pension Planning & Compliance, Vol.28(2), p. 1-22.

ANONYMOUS (2007a): "States' immigration reform impacts businesses." in Journal of Property Management, Vol.72(1), p. 5-5.

ANONYMOUS (2007b): "Investment Strategy." in Dow Theory Forecasts, Vol.63(18), p. 4-5.

ATTEBERRY, WILLIAM L./ RUTHERFORD, RONALD C. (1993): "Industrial Real Estate Prices and Market Efficiency." in Journal of Real Estate Research, Vol.8(3), p. 377.

AUER, LUDWIG (2007). "Ökonometrie."

AXIOMETRICS (2007): "Economic Indicators." retrieved November, 5 2007, from http://www.axiometrics.com/products.html.

BÄNSCH, AXEL (2003). "Wissenschaftliches Arbeiten." Odenburg.

BARTL, HENRIK/ DIBENEDETTO, REGINA (2003): "Capital for an embattled industry: How hotel investors can tap into the debt market." in Journal of Retail & Leisure Property, Vol.3(3), p. 247-259.

BAUM, ANDY (1999): "Evidence of cycles in European commercial real estate markets - and some hypotheses. A global perspective on real estate cycles." NYU: NYU Press: 103-114.

BELL, JOHN (2007): "The Return of the Rental Market." Mortgage Banking. Vol. 67, Issue 10, July 2007: 66-72.

BENJAMIN, JOHN D./ BOYLE, GLENN W./ SIRMANS, C. F. (1990): "Retail Leasing: The Determinants of Shopping Center Rents." in Journal of the American Real Estate & Urban Economics Association, Vol.18(3), p. 302-312.

BENJAMIN, JOHN D. (1994): "The Changing Retail Real Estate Marketplace: An Introduction." in Journal of Real Estate Research, Vol.9(1), p. 1.

BENJAMIN, JOHN D./ JUD, G. DONALD/ WINKLER, DANIEL T. (1998a): "A Simultaneous Model and Empirical Test of the Demand and Supply of Retail Space." in Journal of Real Estate Research, Vol.16(1), p. 1-13.

BENJAMIN, JOHN D./ JUD, G. DONALD/ WINKLER, DANIEL T. (1998b): "The Supply Adjustment Process in Retail Space Markets." in Journal of Real Estate Research, Vol.15(3), p. 297.

BENJAMIN, JOHN D./ JUD, G. DONALD (2000): "Retail Vacancy Rates: The Influence of National and Local Economic Conditions." in Journal of Real Estate Portfolio Management, Vol.6(3), p. 249.

BFS (2008): "Company Profile Saul Centers REITs." retrieved January 22, 2008, from http://biz.yahoo.com/ic/16/16343.html.

BNET (2007): "Diversification." retrieved December, 25 2007, from http://dictionary.bnet.com/definition/Diversification.html.

BOER, DICK/ BROUNEN, DIRK/ OPT VELD, HANS (2005): "Corporate Focus and Stock Performance International Evidence from Listed Property Markets." in Journal of Real Estate Finance & Economics, Vol.31(3), p. 263-281.

BOND, SHAUN A./ PATEL, KANAK (2003): "The Conditional Distribution of Real Estate Returns: Are Higher Moments Time Varying?" in Journal of Real Estate Finance and Economics, Vol.26(2-3), p. 319-339.

BONE-WINKEL, STEPHAN (1997): „Das strategische Management von offenen Immobilienfonds“, Diss, Frankfurt am Main.

BONE-WINKEL, STEPHAN/PFEFFER, TOBIAS (2008a): „Investmentstrategien von REITs“, in: Handbuch REITs, Bone-Winkel/Schulte/Schäfers (editors), Köln.

BONE-WINKEL, STEPHAN/PFEFFER, TOBIAS (2008b): “Bedeutung von nicht börsengehandelten REITs”, in: Handbuch REITs, Bone-Winkel/Schulte/Schäfers (editors), Köln.

BORTZ, JÜRGEN (1999). "Statistik für Human- und Sozialwissenschaftler."

BOX, GEORGE E. P./ JENKINS, GWILYM M./ REINSEL, GREGORY C. (1994). "Time Series Analysis - Forcasting and Control." Englewood Cliffs, Prentice Hall.

BRADY, PETER J./ CONLIN, MICHAEL B. (2004): "The Performance of REIT-owned Properties and the Impact of REIT Market Power." in Journal of Real Estate Finance & Economics, Vol.28(1), p. 81-95.

BRE (2008a): "About BRE." retrieved January 23, 2008, from http://www.breproperties.com/.

BRE (2008b): "Form 10K for the fiscal year ended December 31, 2007 – Annual Report

BREIDENBACH, MANUEL/ MUELLER, GLENN R./ SCHULTE, KARL-WERNER (2006): "Determining Real Estate Betas for Markets and Property Types to Set Better Investment Hurdle Rates." in Journal of Real Estate Portfolio Management, Vol.12(1), p. 73-80.

BROUNEN, DIRK/ EICHHOLTZ, PIET (2004): "Development Involvement and Property Share Performance: International Evidence." in Journal of Real Estate Finance & Economics, Vol.29(1), p. 79-97.

BROWN, GORDON T. (1984): "Real Estate Cycles Alter the Valuation Perspective." in Appraisal Journal, Vol.52(4), p. 539.

BROWN, ROGER J./ LING HIN, LI (2000): "A Note on Intracity Geographic Diversification of Real Estate Portfolios: Evidence from Hong Kong." in Journal of Real Estate Portfolio Management, Vol.6(2), p. 131.

BUENNING, MARTIN (2006): "REITs take shape in draft law." in International Tax Review, p. 51-52.

BUFFET, WARREN (1997): "Quote ", retrieved December 12, 2007, from http://en.wikiquote.org/wiki/Warren_Buffett.

BUTTIMER, RICHARD J./ HYLAND, DAVID C./ SANDERS, ANTHONY B. (2005): "REITs, IPO Waves and Long-Run Performance." in Real Estate Economics, Vol.33(1), p. 51-87.

BYRNE, PETER/ LEE, STEPHEN (2000): "Risk reduction in the United Kingdom property market." in Journal of Property Research, Vol.17(1), p. 23-46.

BYRNE, PETER/ LEE, STEPHEN (2005): "The Impact of Real Estate on the Terminal Wealth of U.K. Mixed-Asset Portfolios: 1972-2001." in Journal of Real Estate Portfolio Management, Vol.11(2), p. 133-145.

CAMPBELL, ROBERT/ WHITE-HUCKINS, NANCY/ SIRMANS, C. (2006): "Domestic and International Equity REIT Joint Ventures: Structuring Corporate Options." in Journal of Real Estate Finance & Economics, Vol.32(3), p. 275-288.

CAMPBELL, ROBERT D./ PETROVA, MILENA/ SIRMANS, C. F. (2003): "Wealth Effects of Diversification and Financial Deal Structuring: Evidence from REIT Property Portfolio Acquisitions." in Real Estate Economics, Vol.31(3), p. 347-366.

CAPOZZA, DENNIS R./ LEE, SOHAN (1995): "Property Type, Size and REIT Value." in Journal of Real Estate Research, Vol.10(4), p. 363.

CAPOZZA, DENNIS R./ SEGUIN, PAUL J. (1999): "Focus, Transparency and Value: The REIT Evidence." in Real Estate Economics, Vol.27(4), p. 587-619.

CASWELL, WARD S. (2007): "Industrial Optimism driven by Rising Construction." in NAREIT - Real Estate Portfolio, Vol.September/ October 2007.

CBDD (2008): "Definiton Reserach Question." retrieved Januar, 15 2008, from http://cbdd.wsu.edu/edev/NetTOM_ToT/Resources/Other/TOM614/page21.htm.

CHENG, HWAHSIN/ MEJIA, LUIS C./ TU, CHARLES C. (2006): "The Stock Return Difference between Industrial REITs and Manufacturing Firms: Space Supply and Demand Effects." in Journal of Real Estate Portfolio Management, Vol.12(3), p. 249-259.

CHIANG, KEVIN C. H./ MING-LONG, LEE (2007): "Spanning Tests on Public and Private Real Estate." in Journal of Real Estate Portfolio Management, Vol.13(1), p. 7-15.

CHINLOY, PETER (1996): "Real Estate Cycles: Theory and Empirical Evidence." in Journal of Housing Research, Vol.7(2), p. 173-190.

CHINLOY, PETER/ MACDONALD, NANCY (2005): "Subprime Lenders and Mortgage Market Completion." in Journal of Real Estate Finance & Economics, Vol.30(2), p. 153-165.

CITIGROUP (2006). The Wall of Capital, UK REIT Conference 2006.

CLAYTON, JIM/ MACKINNON, GREG (2001): "The Time-Varying Nature of the link between REIT, Real Estate and Financial Asset Returns." in Journal of Real Estate Portfolio Management, Vol.7(1), p. 43.

CMCH (2002): "Understanding the Relative Underperformance of REITs in Canada.

COLLIERS (2006): "Industrial Market Report Honolulu Year-End 2005." retrieved December, 28 2007, from http//www.colliers.com/Content/Repositories/ Base/Markets/Honolulu/English/Market_Report/PDFs/CMF_YE2005_IND.pdf.

CONNER, PHILIP/ FALZON, ROBERT (2004): "Volatility differences between the public and private real estate markets." in Briefings in Real Estate Finance, Vol.4(2), p. 107-117.

COOPER, MICHAEL/ DOWNS, DAVID H./ PATTERSON, GARY A. (1999): "Real Estate Securities and a Filter-Based, Short-Term Trading Strategy." in Journal of Real Estate Research, Vol.18(2), p. 313.

CORCORAN, P./ IWAI, Y. (2003): "Firming Property Prices and Weak Cash Flows." in The Journal of Portfolio Management, Vol.Real Estate Issue.

CORGEL, JOHN (2007): "Technological Change as Reflected in Hotel Property Prices." in Journal of Real Estate Finance & Economics, Vol.34(2), p. 257-279.

CORGEL, JOHN B. (2005): "Hotel Real Estate Markets." in The Journal of Portfolio Management, Vol.Special Issue 2005.

CRAFT, TIMOTHY M. (2001): "The Role of Private and Public Real Estate in Pension Plan Portfolio Allocation Choices." in Journal of Real Estate Portfolio Management, Vol.7(1), p. 17.

CRONQVIST, HENRIK/ HOGFELDT, PETER/ NILSSON, MATTIAS (2001): "Why Agency Costs Explain Diversification Discounts." in Real Estate Economics, Vol.29(1), p. 85.

CRUMLEY, RYAN/ FISHER, DONNA K. (2005): "Analysis of international joint ventures within real estate investment trusts." in Briefings in Real Estate Finance, Vol.4(3), p. 217-227.

DATASTREAM (2008): "Multiple Queries from the Datastream Database." in.

DCR (2007): "Cycle Monitor - Real Estate Market Cycles, 2nd Quarter 2007 ", retrieved September 15, 2007, from http//www.dividendcapital.com/files/File/DCG/Market%20Cycle%20Reports/cycle%20monitor%2007q2%20(2).pdf.

DDR (2008): "About Developers Diversified Realty." retrieved April 22, 2008, from http://www.ddr.com/.

DELA CRUZ, TONY (2005): "Today's REITs seek smart growth, strong fundamentals." in Hotel & Motel Management, Vol.220(16), p. 30-39.

DERMISI, SOFIA V. (2007): "The Impact of Terrorism Fears on Downtown Real Estate Chicago Office Market Cycles." in Journal of Real Estate Portfolio Management, Vol.13(1), p. 57-73.

DESTEFANO, MICHAEL (2005): "Stock Returns and the Business Cycle." in CFA Digest, Vol.35(2), p. 42-43.

DEWEESE, CHELSEA (2005): "REITs Spread to Timber Industry." in Wall Street Journal - Eastern Edition, Vol.246(96), p. C3-C3.

DOC (2008): "Department of Conversation - California Historical Earthquake Online Database." retrieved April 22, 2008, from http://redirect.conservation.ca.gov/cgs/rghm/quakes/historical/index.htm.

DOKKO, YOON/ ET AL. (1999): "Real Estate Income and Value Cycles: A Model of Market Dynamics." in Journal of Real Estate Research, Vol.18(1), p. 69-95.

DOWNS, GARY P. (1999): "The Game of Tenant Relocation." in Journal of Property Management, Vol.64(3), p. 104.

ECONTERMS (2008): "Hypotheses." from http//economics.about.com/cs/economics glossary/g/null_hypothesis.htm.

EDELSTEIN, ROBERT/ TSANG, DESMOND (2007): "Dynamic Residential Housing Cycles Analysis." in Journal of Real Estate Finance & Economics, Vol.35(3), p. 295-313.

EGP (2008): "About EastGroup Properties." from http://www.eastgroup.net/.

EICHHOLTZ, PIET/ OP T VELD, HANS/ SCHWEITZER, MARK (1997): "Outperformance: Does Managerial Specialization Pay?" Working Papers -- Financial Institutions Center at The Wharton School: 1.

ELLIS, CRAIG/ WILSON, PATRICK J./ ZURBRUEGG, RALF (2007): "Real Estate 'Value' Stocks and International Diversification." in Journal of Property Research, Vol.24(3), p. 265-287.

ELS (2008): "About the Company." retrieved April 23, 2008, from http://www.equitylifestyle.com/index.html.

EPRA (2008a): "FTSE/NAREIT Global Real Estate Index - March 2008." retrieved April 28, 2008, from http://www.epra.com/media/.

EPRA (2008b): "Global Market Update." retrieved April 25, 2008, from http://www.epra.com/media/Monthly_Market_Review_March_2008.pdf.

ESTATE", "PROSPER REAL (2005): "Multif-family." retrieved December, 25 2007, from http://blog.prosperlearning.com/realestate/?m=200701.

EVANS, RICHARD (2007): "Real Estate Cycle Conditions for Office, Retail and Warehouse Markets." in Business Perspectives, Vol.18(3), p. 12-15.

FAHRMEIER, LUDWIG et al. (2007). "Statistik - Der Weg zur Datenanalyse." Springer.

FCH (2008): "About Felcor." retrieved April 22, 2008, from http://www.felcor.com/.

FINANCIAL-DICTIONARY (2007): "Definition: Total Return." retrieved December 17, 2007, from http://financial-dictionary.thefreedictionary.com/total+return.

FIRSTINDUSTRIAL (2008): "Form 10K for the fiscal year ended December 31, 2007 - Annual Report

FISHER, JEFFREY D. (2005): "New Strategies for Commercial Real Estate Investment and Risk Management." in Journal of Portfolio Management, Vol.32, p. 154-161.

FORBES (2007): "Forbes List: World Billionaires." retrieved December 22, 2007, from http://www.forbes.com/lists/2007/10/07billionaires_Warren-Buffett_C0R3.html.

FORGEY, FRED A./ MULLENDORE, WALTER E./ RUTHERFORD, RONALD C. (1997): "Market Structure in the Residential Real Estate Brokerage Market." in Journal of Real Estate Research, Vol.14(1/2), p. 107.

FR (2008): "Investor Relation." retrieved April 27, 2008, from http://www.firstindustrial.com/main.php?in_pg=who_we_are.

G.W (1999): "A real-estate cycle unlike any other." in Cornell Hotel & Restaurant Administration Quarterly, Vol.40(1), p. 13.

GALLAGHER, MARK/ MANSOUR, ASIEH (2000): "An Analysis of Hotel Real Estate Market Dynamics." in Journal of Real Estate Research, Vol.19(1/2), p. 133.

GELTNER, DAVID et al. (2007). "Commercial Real Estate Analysis & Investment "; Mason, Thomson South-Western.

GERING, ART (2007): "Changes on the Horizon in Industrial Market " NAREIT - Real Estate Portfolio. July/ August 2006.

GGP (2008): "About General Growth Properties." retrieved April 15, 2008, from http://www.ggp.com/default.aspx.

GIAMBONA, ERASMO/ GOLEC, JOSEPH/ GIACCOTTO, CARMELO (2006): "The Conditional Performance of REIT Stock Repurchases." in Journal of Real Estate Finance & Economics, Vol.32(2), p. 129-149.

GILIBERTO, MICHAEL/ HOPKINS JR, ROBERT E. (1990): "Metro Employment Trends: Analysis and Portfolio Considerations, Solomon Brothers Report, New York." in.

GILIBERTO, MICHAEL/ HAMELINK, FOORT (1999): "Optimal diversification within mixed-asset portfolios using a conditional heteroskedasticity." in Journal of Real Estate Portfolio Management, Vol.5(1), p. 31.

GILIBERTO, MICHAEL (2004): "Assessing Real Estate Volatility." in Journal of Portfolio Management, p. 122-128.

GILIBERTO, S. MICHAEL (1992): "The Allocation of Real to Future Mixed-Asset Institutional Portfolios." in Journal of Real Estate Research, Vol.7(4), p. 423.

GLEASON, KIM/ PAYNE, BRUCE/ WIGGENHORN, JOAN (2007): "AN EMPIRICAL INVESTIGATION OF GOING PRIVATE DECISIONS OF U.S. FIRMS." in Journal of Economics & Finance, Vol.31(2), p. 207-218.

GLOSSARY (2007): "Investment Strategy." retrieved July 7, 2007, from http://www.investorwords.com/2627/investment_strategy.html.

GOETZMANN, WILLIAM N./ WACHTER, SUSAN M. (1995): "Clustering for Real Estate Portfolios." in Real Estate Economics, Vol.23, p. 271-310.

GOOLSBEE, AUSTAN/ MAYDEW, EDWARD (2002): "Taxes and Organizational Form: The Case of REIT Spin--offs." in National Tax Journal, Vol.55(3), p. 441-456.

GORDON, JACQUES/ MOSBAUGH, PAIGE/ CANTER, TODD (1996): "Integrating Regional Economic Indicators with the Real Estate Cycle." in Journal of Real Estate Research, Vol.12(3), p. 469.

GRAASKAMP, JAMES (1991). The failure of the universities to teach the real estate process as an interdisciplinary art form. Graaskamp on real estate. JARCHOW, S. P. . Washington: 40-50.

GRAFF, RICHARD A. (2001): "Economic Analysis suggests that REIT Investment Characterics are not as advertised." in Journal of Portfolio Management, Vol.7(2), p. 99-124.

GUILKEY, DAVID/ MILES, MIKE/ COLE, REBEL (1989): "The Motivations for Institutional Real Estate Sales and Implications for Asset Class Returns." in Journal of the American Real Estate & Urban Economics Association, Vol.17(1), p. 70-86.

GYOURKO, JOSEPH/ NELLING, EDWARD (1996): "Systematic Risk and Diversification in the Equity REIT Market." in Real Estate Economics, Vol.24(4), p. 493-515.

HAMELINK, FOORT/ HOESLI, MARTIN (2004): "What Factors Determine International Real Estate Security Returns?" in Real Estate Economics, Vol.32(3), p. 437-462.

HANSON, BJORN (1999): "Lodging REIT's stock values decrease more than C-Corps." in Hotel & Motel Management, Vol.214(8), p. 18.

HARDIN III, WILLIAM G./ WOLVERTON, MARVIN L. (1999): "Equity REIT Property Acquisitions: Do Apartment REITs Pay a Premium." in Journal of Real Estate Research, Vol.17(1/2), p. 113.

HARDIN III, WILLIAM G./ CARR, JON (2006): "Disaggregating Neighborhood and Community Center Property Types." in Journal of Real Estate Research, Vol.28(2), p. 167-192.

HARRIS, JACK (2001): "Working Papers." in Journal of Real Estate Literature, Vol.9(2), p. 253-259.

HARTZELL, DAVID J./ SHULMAN, DAVID G./ WURTZEBACH, CHARLES H. (1987): "Refining the Analysis of Regional Diversification for Income-Producing Real Estate." in Journal of Real Estate Research, Vol.2(2), p. 85.

HARTZELL, JAY C./ KALLBERG, JARL G./ LIU, CROCKER H. (2005): "The Role of the Underlying Real Asset Market in REIT IPOs." in Real Estate Economics, Vol.33(1), p. 27-50.

HE, LING T. (2000): "Casual Relationships Between Apartment REIT Stock Returns and Unsecuritized Residential Real Estate." in Journal of Real Estate Portfolio Management, Vol.6(4), p. 365.

HEATH, TRACY (1998): "Developers Diversified Realty, Oliver McMillan form new REIT." in National Real Estate Investor, Vol.40(7), p. 20.

HELLER, LAURA (2002): "Credit business can be a boost—or it can go bust - Sears Roebuck, Target's credit programs." retrieved February 25, 2008, from http://findarticles.com/p/articles/mi_m0FNP/is_22_41/ai_95447080.

HENDERSHOTT, PATRIC H./ KANE, EDWARD J. (1995): "U.S. Office Market Values During the Past Decade: How Distorted Have Appraisals Been?" in Real Estate Economics, Vol.23(2), p. 101-116.

HESS, ROBERT/ LIANG, YOUGUO (2003a): "Decomposing the Recent Office Market Vacancy Spike." in Real Estate Finance (Aspen Publishers Inc.), Vol.19(6), p. 12.

HESS, ROBERT/ LIANG, YOUGUO (2003b): "Sharpening Their Strategies: REITs Use Niches to Address Diverse Market Conditions." in Real Estate Finance (Aspen Publishers Inc.), Vol.20(4), p. 3-14.

HESS, ROBERT/ LIANG, YOUGOU (2006): "Size-Tiered Economic Geography: An Update." in Real Estate Finance Journal, Vol.22(2), p. 17-28.

HESS, ROBERT C./ LIANG, YOUGUO/ MCALLISTER, RUSSELL (2001): "An Institutional Perspective on Hotel Investing." in Real Estate Finance (Euromoney Institutional Investor PLC), Vol.18(2), p. 51.

HOESLI, MARTIN/ CAMILO, S. MORENO (2007): "Securitized Real Estate and its Link with Financial Assets and Real Estate: An International Analysis." in Journal of Real Estate Literature, Vol.15(1), p. 59-84.

HOMBURG, CHRISTIAN/ GIERNING, ANETTE (1996): "Konzeptionalisierung und Operationalisierung komplexer Konstrukte, ein Leitfaden für die Marketingforschung." in Marketing - Zeitschrift für Forschung und Praxis, Vol.8(1), p. 5-24.

HOMEPROPERTIES (2008): "Form 10K for the fiscal year ended December 31, 2007 - Annual Report

HST (2005): "10-K, 12/31/2004.

HST (2006): "10-K, 12/31/2005.

HST (2007): "10-K, 12/31/2006.

HUDSON-WILSON, SUSAN et al. (2005): "Why Real Estate?" in Journal of Portfolio Management, Vol.32, p. 12-22.

HWAHSIN, CHENG/ MEJIA, LUIS C./ TU, CHARLES C. (2006): "The Stock Return Difference between Industrial REITs and Manufacturing Firms: Space Supply and Demand Effects." in Journal of Real Estate Portfolio Management, Vol.12(3), p. 249-259.

IASB (2008): "IAS Accounting - Investment Properties." retrieved February 22, 2008, from http://www.iasb.org/Search.htm?s=investment%20properties.

ICSC (2002): "Development in Underserved Retail Markets - A summary of a discussion of the challenges and recommendations for improving the processs of retail development in underserved, urban markets." in.

INKPP (2008): "About the Company." retrieved April 22, 2008, from http://www.innkeepersusa.com/.

INVESTOPEDIA (2007): "Definition Investment Strategy." retrieved August, 12 2007, from http://www.answers.com/topic/investment-strategy?cat=biz-fin.

INVESTORWORDS (2007a): "Equity to Assets Ratio." retrieved December, 16 2007, from http://www.investorwords.com/283/asset_equity_ratio.html.

INVESTORWORDS (2007b): "Definition Finite REIT." retrieved October, 12 2007, from http://www.investorwords.com/1965/Finite_life_REIT.html.

KAISER, RONALD W. (1997): "The Long Cycle in Real Estate." in Journal of Real Estate Research, Vol.14(3), p. 233.

KAISER, RONALD W. (1999): "Using capital markets' value cycles in allocating to real estate vs. stocks of bonds." in Journal of Real Estate Portfolio Management, Vol.5(1), p. 1-22.

KAISER, RONALD W. (2005): "Investment Styles and Style Boxes in Equity Real Estate: Can the Emerging Model Succeed in Classifying Real Estate Alternatives?" in Journal of Real Estate Portfolio Management, Vol.11(1), p. 5-18.

KAKATI, M. (2005): "Stock Valuation Process -- The Practitioners' View." in Finance India, Vol.19(2), p. 513-523.

KENG, TAN YEN (2004): "Strategic Investment Issues for Listed Property Trusts, University of Western Sydney. Doctor of Philosophy.

KIMCO (2008): "About Kimco." retrieved April 22, 2008, from http://www.kimcorealty.com/about/index.asp.

KINDLER, ROBERT ET AL. (2008): "What Public Company Directors Should Know About Going Privates." in Journal of Applied Corporate Finance, Vol.20(1), p. 84-95.

KLAMER, PIM/ GORTER, CEES/ NIJKAMP, PETER (2001): "Retail Investments by Real Estate Investment Trusts, Tinbergen Institute, Tinbergen Institute Discussion Papers: 01-049/3.

KLEIMAN, ROBERT T./ PAYNE, JAMES E./ SAHU, ANANDI P. (2002): "Random Walks and Market Efficiency: Evidence from International Real Estate Markets." in Journal of Real Estate Research, Vol.24(3), p. 279.

KOHL, NICOLAS (2008): "Corporate Governance and Market Valuation of Publicly Traded Real Estate Companies.

KORNMEIER, MARTIN (2007). "Wissenschaftstheorie und Wissenschaftliches Arbeiten - Eine Einführung für Wirtschaftswissenschaftler." Heidelberg.

KUHLE, JAMES L. (1987): "Portfolio Diversification and Return Benefits-Common Stock vs. Real Estate Investment Trusts (REITs)." in Journal of Real Estate Research, Vol.2(2), p. 1.

LARKIN, DANIEL (2006): "Hotels - The fifth food group? ." in Journal of Retail & Leisure Property, Vol.6, p. 23-28.

LEE, STEPHEN/ STEVENSON, SIMON (2003): "Empirical evidence on the micro and macro forecasting ability of real estate funds." in Journal of Property Research, Vol.20(3), p. 207-234.

LEE, STEPHEN/ STEVENSON, SIMON (2005a): "The Case for REITs in the Mixed-Asset Portfolio in the Short and Long Run." in Journal of Real Estate Portfolio Management, Vol.11(1), p. 55-80.

LEE, STEPHEN/ STEVENSON, SIMON (2005b): "Testing the statistical significance of sector and regional diversification." in Journal of Property Investment & Finance, Vol.23(5), p. 394-411.

LEE, STEPHEN/ DEVANEY, STEVEN (2007): "The Changing Importance of Sector and Regional Factors in Real Estate Returns: 1987-2002." in Journal of Property Research, Vol.24(1), p. 55-69.

LEE, STEPHEN/ STEVENSON, SIMON (2007): "The substitutability of REITs and value stocks." in Applied Financial Economics, Vol.17(7), p. 541-557.

LEE, STEPHEN L. (2005): "The Return Due to Diversification of Real Estate to the U.S. Mixed-Asset Portfolio." in Journal of Real Estate Portfolio Management, Vol.11(1), p. 19-28.

LEE, STEPHEN; NEWELL, GRAHAM; STEVENSON, SIMON (2003): "The Role of Market Timing and Property Selection in Listed Property Trust Per-formance." Pacific-Rim Real Estate Society Annual Conference, Brisbane: 1 - 14.

LIANG, YOUGUO/ CHATRATH, ARJUN/ MCINTOSH, WILLARD (1996): "Apartment REITs and Apartment Real Estate." in Journal of Real Estate Research, Vol.11(3), p. 277.

LIANG, YOUGUO/ MYER, F. C. NEIL/ WEBB, JAMES R. (1996): "The Bootstrap Efficient Frontier for Mixed-Asset Portfolios." in Real Estate Economics, Vol.24(2), p. 247-256.

LIANG, YOUGUO (1998): "REIT Style and Performance." in Journal of Real Estate Portfolio Management, Vol.4(1), p. 69.

LIAO, HSIEN-HSING/ MEI, JIANPING (1998): "Risk Characterisitcs of Real Estate Related Securities - An Extension of Liu and Mei (1992)." in Real Estate Economics, Vol.16(3), p. 279-90.

LIBERTY (2008): "10-K - Annual Report Pursuant to Section 13 or 15(d) Of the Securities Exchange Act of 1934.

LIN, CRYSTAL/ YUNG, KENNETH (2006): "Equity Capital Flows and Demand for REITs." in Journal of Real Estate Finance & Economics, Vol.33(3), p. 275-291.

LING, DAVID/ NARANJO, ANDY (2006): "Dedicated REIT Mutual Fund Flows and REIT Performance." in Journal of Real Estate Finance & Economics, Vol.32(4), p. 409-433.

LRY (2008): "About Liberty Property Trust." retrieved April 24, 2008, from http://www.libertyproperty.com/.

LUTZ, WARREN (2002): "Industrial Shifts Gear." in Commercial Investment Real Estate, Vol.July/ August 2002.

MACK-CALI (2008): "10-K - Annual Report Pursuant to Section 13 or 15(d) Of the Securities Exchange Act of 1934.

MAGUIRE (2008): "10-K - Annual Report Pursuant to Section 13 or 15(d) Of the Securities Exchange Act of 1934.

MALLEY, MIKE (1997): "Hotel REITs: Powerful but confusing." in Hotel & Motel Management, Vol.212(10), p. 55.

MALPEZZI, STEPHEN/ WACHTER, SUSAN M. (2005): "The Role of Speculation in Real Estate Cycles." in Journal of Real Estate Literature, Vol.13(2), p. 143-164.

MANSOUR, ASIEH/ GALLAGER, MARK (2000): "An analysis of hotel real estate market dynamics." in The Journal of Real Estate Research, Vol.19, p. 133-64.

MARKETWATCH (2007), retrieved November 22, 2007, from http://www.marketwatch.com/news/story/story.aspx?siteid=mktw&guid=%7B793CFEE4-B0A2-4C3E-9A72-D96F8DDA26F1%7D.

MARONEY, NEAL/ NAKA, ATSUYUKI (2006): "Diversification Benefits of Japanese Real Estate Over the Last Four Decades." in Journal of Real Estate Finance & Economics, Vol.33(3), p. 259-274.

MEJIA, LUIS C./ BENJAMIN, JOHN D. (2002): "What Do We Know About the Determinants of Shopping Center Sales? Spatial vs. Non-Spatial Factors." in Journal of Real Estate Literature, Vol.10(1), p. 3-26.

MICHALSKI, TINO/ RASCHE, CHRISTOPH (2002): "Die Veränderung des Gründungsverhalten im Übergang von der New Economy zur True Economy." in GMIP - Contributions to Management, Vol.3/2002.

MIGDAL, NELSON F. (2006): "Condo Hotel Sales-The Next Frontier." in Real Estate Finance (Aspen Publishers Inc.), Vol.22(6), p. 25-28.

MILLER, NORMAN G. et al. (2003): "The 9/11/2001 Impact on Trophy and Tall Office Property." in Journal of Real Estate Portfolio Management, Vol.9(2), p. 107-125.

MILLER, STEPHEN M./ CLAURETIE, TERRENCE M./ SPRINGER, THOMAS M. (2006): "Economies of Scale and Cost Efficiencies: A Panel-Data Stochastic-Frontier Analysis of Real Estate Investment Trusts." in Manchester School (14636786), Vol.74(4), p. 483-499.

MNRTA (2008): "About the Company." retrieved February 22, 2008, from http://www.mreic.com/index.html.

MOORADIAN, ROBERT M./ YANG, SHIAWEE X. (2001): "Dividend Policy and Firm Performance: Hotel REITs vs. Non-REIT Hotel Companies." in Journal of Real Estate Portfolio Management, Vol.7(1), p. 79.

MUELLER, ANDREW G./ MUELLER, GLENN R. (2003): "Public and Private Real Estate in a Mixed-Asset Portfolio." in Journal of Real Estate Portfolio Management, Vol.9(3), p. 193-203.

MUELLER, GLENN R./ ZIERING, BARRY A. (1992): "Real Estate Portfolio Diversification Using Economic Diversification." in Journal of Real Estate Research, Vol.7(4), p. 375.

MUELLER, GLENN R. (1993): "Refining Economic Diversification Strategies for Real Estate Portfolios." in Journal of Real Estate Research, Vol.8(1), p. 55.

MUELLER, GLENN R./ LAPOSA, S.P. (1994a): "The Path of Goods Movement ", in journal of Real Estate Finance Vol.11(2), p. 42-55.

MUELLER, GLENN R./ LAPOSA, S.P. (1994b): "Evaluating Real Estate Markets Using Cycle Analysis." 1994 American Real Estate Society Meetings in Santa Barbara.

MUELLER, GLENN R./ LAPOSA, S.P. (1994c): "Submarket Cycle Analysis: A Case Study of Submarkets in Philadelphia, Seattle and Salt Lake." 1994 American Real Estate Society Meetings in Santa Barbara.

MUELLER, GLENN R./ LAPOSA, S.P. (1994d): "Real Estate Market Evaluation Using Cycle Analysis." International Real Estate Society Conference, Stockholm 1995, Sweden.

MUELLER, GLENN R. (1995): "Understanding Real Estate´s Physical and Financial Market Cycles." in Journal of Real Estate Finance, Vol.12(1), p. 47-52.

MUELLER, GLENN R./ PAULEY, KEITH R. (1995): "The Effect of Interest-Rate Movements on Real Estate Investment Trusts." in Journal of Real Estate Research, Vol.10(3), p. 319.

MUELLER, GLENN R. (1998): "REIT Size and Earnings Growth: Is Bigger Better, or a New Challenge?" in Journal of Real Estate Portfolio Management, Vol.4(2), p. 149.

MUELLER, GLENN R. (1999): "Real Estate Rental Growth Rates at Different Points in the Physical Market Cycle." in Journal of Real Estate Research, Vol.18(1), p. 131.

MUELLER, GLENN R./ ANIKEEFF, MICHAEL A. (2001): "Real Estate Ownership and Operating Businesses: Does Combining Them Make Sense for REITs?" in Journal of Real Estate Portfolio Management, Vol.7(1), p. 55.

MUELLER, GLENN R. (2002): "What Will the Next Real Estate Cycle Look Like?" in Journal of Real Estate Portfolio Management, Vol.8(2), p. 115.

MUELLER, GLENN R. (2006): "Testimony of Glenn R. Mueller Ph.D. before the Subcomittee on Financial Institutions and Consumer Credit of the Committee on Financial Services." United House of Representatives September 14, 2006.

MUELLER, GLENN R. (2007a): "Securitization of Real Estate".

MUELLER, GLENN R. (2007b): "Why Real Estate Fits a Portfolio - Size!" from The figures are based on Pension & Investments, October 30, 2006 and Prudential Real Estate Investors, December 2006.

MUELLER, GLENN R./ MUELLER, ANDREW G. (2007): "Warehouse Demand and the Path of Goods Movement." in Journal of Real Estate Portfolio Management, Vol.13(1), p. 45-55.

MYER, F. C. NEIL/ WEBB, JAMES R. (1994a): "Retail Stocks, Retail REITs and Retail Real Estate." in Journal of Real Estate Research, Vol.9(1), p. 65-84.

MYER, F. C. NEIL/ WEBB, JAMES R. (2000): "Management Styles of REIT Funds." in Journal of Real Estate Portfolio Management, Vol.6(4), p. 339.

MYER, NEIL F. C./ WEBB, JAMES R. (1994b): "Retail Stocks, Retail REITs and Retail Real Estate." in Journal of Real Estate Research, Vol.9(1), p. 65.

NAA (2008): "National Apartment Association - Energy Program." retrieved February 22, 2008, from http://www.naahq.org/.

NAJAND, MOHAMMAD/ LIN, CRYSTAL YAN/ FITZGERALD, ELIZABETH (2006): "The Conditional CAPM and Time Varying Risk Premium for Equity REITs." in Journal of Real Estate Portfolio Management, Vol.12(2), p. 167-175.

NAREIT (1999): "REIT Modernization Act - Detailed Analysis."

NAREIT (2002): "NAREIT White Paper on Funds From Operations, April 2002." in.

NAREIT (2007a): "About REITs." retrieved November, 12 2007, from www.nareit.com.

NAREIT (2007b): "FTSE NAREIT Indices." retrieved October, 12 2007, from http://www.nareit.com/library/domestic/ftseQandA.pdf.

NAREIT (2007c): "Nareit Chart Book." retrieved November 12, 2007, from http://www.nareit.com/library/performance/CB0709.pdf.

NAREIT (2008a): "Data Library - Performance Data." retrieved January 22, 2008, from http://www.nareit.com/library/performance/index.cfm.

NAREIT (2008b): "High Energy - Operating Expenses." retrieved May 22, 2008, from http://www.nareit.com/portfoliomag/04marapr/feat1side_b.shtml.

NAREIT (2008c), retrieved March 12, 2008, from http//www.nareit.com/ policy/government/RMA-2.pdf

NAREIT (2008d): "Constituent Companies." retrieved March, 15th 2008, from http://www.nareit.com/library/domestic/companies.cfm.

NCREIF (2008): "NCREIF Classification." retrieved April 12, 2008, from http://www.ncreif.com/.

NELSON, THERON R./ NELSON, SUSAN L. (2003): "Regional Models for Portfolio Diversification." in Journal of Real Estate Portfolio Management, Vol.9(1), p. 71.

NEWELL, GRAEME et al. (2004): "An International Perspective on Real Estate Research Priorities." in Journal of Real Estate Portfolio Management, Vol.10(3), p. 161-170.

NICHOLS, MARK/ BOUTELL, MIKE (2005): "The introduction of REITs and their impact on the leisure sector." in Journal of Retail & Leisure Property, Vol.4(4), p. 295-300.

NNNREIT (2008): "About the Company." retrieved February 22, 2008, from http://www.nnnreit.com/.

OMB (2008): "Metropolitan and Micorpolitan Statistical Areas defined by the U.S. Census Bureau and the U.S. Office of Management and Budget." in.

ORLANDO-BIZ (2002): "Orlando multifamily market stabilizes." Orlando Business Journal.

OTT, STEVEN H./ RIDDIOUGH, TIMOTHY J./ HA-CHIN, YI (2005): "Finance, Investment and Investment Performance: Evidence from the REIT Sector." in Real Estate Economics, Vol.33(1), p. 203-235.

OWUSU-ANSAH, STEPHEN/ YEOH, JOANNA (2006): "Relative Value Relevance of Alternative Accounting Treatments for Unrealized Gains: Implications for the IASB." in Journal of International Financial Management & Accounting, Vol.17(3), p. 228-255.

PAGLIARI JR, JOSEPH L./ SCHERER, KEVIN A./ MONOPOLI, RICHARD T. (2004): "Public versus Private Real Estate Equities." in Journal of Portfolio Management, p. 101-111.

PAYNE, JAMES/ WATERS, GEORGE (2007): "Have Equity REITs Experienced Periodically Collapsing Bubbles?" in Journal of Real Estate Finance & Economics, Vol.34(2), p. 207-224.

PAYNE, JAMES E./ MOHAMMADI, HASSAN (2004): "The transmission of shocks across real estate investment trust (REIT) markets." in Applied Financial Economics, Vol.14(17), p. 1211-1217.

PAYNE, JAMES E. (2006): "Further Evidence on the Transmission of Shocks across REIT Markets: An Examination of REIT Sub-sectors." in Applied Financial Economics Letters, Vol.2(3), p. 141-146.

PAYNE, JAMES E./ ZUEHLKE, THOMAS W. (2006): "Duration dependence in real estate investment trusts." in Applied Financial Economics, Vol.16(5), p. 413-423.

PENG, CHIEN-WEN/ CHANG, CHIN-OH/ LIN, ANTSONG (1998): "The Impact of Real Estate Cycles on Construction Lags. (In Chinese. With English summary.)." in Taiwan Economic Review, Vol.26(4), p. 409-429.

PETERS, EDGAR (2003): "Simple and Complex Market Inefficiencies: Integrating Efficient Markets, Behavioral Finance, and Complexity." in Journal of Behavioral Finance, Vol.4(4), p. 225-233.

PETKUNAS, FRANK J./ MUELLER, GLENN R. (1998): "Commingled Real Estate Fund Trading: The Emergence of a Formalized Secondary Trading Market." in Journal of Real Estate Portfolio Management, Vol.4(1), p. 43.

PFEFFER, TOBIAS (2006): "Efficient Real Estate Asset Allocation - Do specialized REITs outperform diversified REITs?" ebs Department of Real Estate. Oestrich-Winkel.

PFEFFER, TOBIAS (2007): "Real Estate en Route to Capital Markets - State of Real Estate Investment Trusts in Germany." in German Real Estate Yearbook 2008: Assets, Industries, Trends and Market Players, Vol.1.

PING, CHENG/ ROULAC, STEPHEN E. (2007): "Measuring the Effectiveness of Geographical Diversification." in Journal of Real Estate Portfolio Management, Vol.13(1), p. 29-44.

POORVU, WILLIAM J./ CRUIKSHANK, JEFFREY L. (2000). "The Real Estate Game - The Intelligent Guide to Decision-Making and Investment." New York, The Free Press.

POSTPROPERTIES (2008a): "Form 10K for the fiscal year ended December 31, 2007 - Annual Report

POSTPROPERTIES (2008b): "About Post Properties." retrieved January 16, 2008, from http://www.postproperties.com/.

PPR (2007a): "Compilation of PPR´s Quarterly 07Q2 Data, 260 Franklin Street, 17th Floor, Boston, Massachusetts 02110, www.ppr.com.

PPR (2007b): "About PPR." retrieved October 12, 2007, from http://www.ppr.info/about/index.html.

PREI (1992): "Homeownership and Commercial Real Estate: Similar but Different, December 2006.

PRINCETON (2007): "WordNet." retrieved December 12, 2007, from http//wordnet. princeton.edu/perl/webwn?s=fundamental.

PROLOGIS (2007a): "ProLogis Launches New Property Funds in Europe, Mexico and South Korea." retrieved April 5, 2008, from http//ir.prologis.com/ investors/releasedetail.cfm?ReleaseID=260410.

PROLOGIS (2007b): "About." retrieved October 14, 2007, from http//www.prologis. com/en/default.aspx.

PROLOGIS (2008): "Form 10K for the fiscal year ended December 31, 2007 - Annual Report.

PYHRR, STEPHEN A./ BORN, WALDO L./ WEBB, JAMES R. (1990): "Development of a Dynamic Investment Strategy under Alternative Inflation Cycle Scenarios." in Journal of Real Estate Research, Vol.5(2), p. 177.

PYHRR, STEPHEN A. et al. (1990). Analyzing Real Estate Asset Performance during Periods of Market Disequilibrium under Cyclical Economic Conditions: A Framework for Analysis: 75-106.

PYHRR, STEPHEN A./ ROULAC, STEPHEN E./ BORN, WALDO L. (1999): "Real Estate Cycles and Their Strategic Implications for Investors and Portfolio Managers in the Global Economy." in Journal of Real Estate Research, Vol.18(1), p. 7-68.

PYHRR, STEPHEN A. et al. (2003): "Project and Portfolio Management Decisions: A Framework and Body of Knowledge Model for Cycle Research." in Journal of Real Estate Portfolio Management, Vol.9(1), p. 1.

PYHRRN, STEPHEN A./ ROULAC, STEPHEN E./ BORN, WALDO L. (1999): "Real Estate Cycles and Their Strategic Implications for Investors and Portfolio Managers in the Global Economy." in Journal of Real Estate Research, Vol.18(1), p. 7.

RE-BUSINESSONLINE (2007): "Top 10 Retail Markets To Watch For Investors." retrieved November 12, 2007, from http//www.rebusinessonline.com/ article_archive/06-29-07.shtml.

REALTYTIMES (2007): "Job Growth Will Impact Commercial Leasing Activity, Says NAR." retrieved December, 27 2007, from http//realtytimes.com/ rtpages/20020918_leasingactivity.htm.

RECA (2006): "Where is U.S. Real Estate Capital Coming from?" retrieved November 12, 2007, from http://www.rcanalytics.com/home.aspx.

REED (2007): "Reed Construction Data." retrieved December, 26 2007, from http://www.reedconstructiondata.com/.

RENAUD, BERTRAND (1997): "The 1985 to 1994 Global Real Estate Cycle: An Overview." in Journal of Real Estate Literature, Vol.5(1), p. 13-44.

RENAUD, BERTRAND M. (1999): "The 1985-94 Global Real Estate Cycle: Its Causes and Consequences, The World Bank, Policy Research Working Paper Series: 1452.

REYNOLDS, TIM (1997): "REITs under a brighter light." in Journal of Financial Planning, Vol.10(2), p. 68.

RIDDIOUGH, TIMOTHY J./ MORIARTY, MARK/ YEATMAN, P. J. (2005): "Privately Versus Publicly Held Asset Investment Performance." in Real Estate Economics, Vol.33(1), p. 121-146.

ROTTKE, NICO/ WERNECKE, MARTIN/ SCHWARTZ, ARTHUR L., JR. (2003): "Real Estate Cycles in Germany--Causes, Empirical Analysis and Recommendations for the Management Decision Process." in Journal of Real Estate Literature, Vol.11(3), p. 327-345.

RUTTERFORD, JANETTE (2004): "From dividend yield to discounted cash flow: a history of UK and US equity valuation techniques." in Accounting, Business & Financial History, Vol.14(2), p. 115-149.

SAGALYN, LYNNE B. (1990): "Real Estate Risk and the Business Cycle: Evidence from Security Markets." in Journal of Real Estate Research, Vol.5(2), p. 203.

SCHÄFERS, WOLFGANG (1997): „Strategisches Management von Unternehmens-immobilien: Bausteine einer theoretischen Konzeption und Ergebnisse einer empirischen Untersuchung“, in: Schulte, Karl-Werner: Schriften zur Immobilienökonomie, Band 3, Köln, 1997, at the same time dissertation at the European Business School, Oestrich-Winkel, 1996.

SCHÄFERS, WOLFGANG/KOHL, NICOLAS, SCHULTE, KARL-WERNER (2008a): „Wertorientierte Steuerung von G-REITs“, in: Handbuch REITs, Bone-Winkel/Schulte/Schäfers (editors), Köln.

SCHÄFERS, WOLFGANG et al. (2008b): „Erfolgsfaktoren beim Börsengang von German Real Estate Investment Trusts“, in: Handbuch REITs, Bone-Winkel/Schulte/Schäfers (editors), Köln.

SCHÄFERS, WOLFGANG/KOHL, NICOLAS/SCHULTE, KARL-WERNER (2008c): Corporate Governance bei Real Estate Investment Trusts, in: Handbuch REITs, Bone-Winkel/Schulte/Schäfers (editors), Köln.

SCHICK, THEODORE/ VAUGHN, LEWIS (2002). "How to think about weired things: Critical thinking for a New Age." Boston.

SCHLITTGEN, RAINER/ STREITBERG, BERND (2001). "Zeitreihenanalyse." Munich/ Vienna.

SCHULTE, KARL-WERNER/ ROTTKE, NICO/ PITSCHKE, CHRISTOPH (2005): "Transparency in the German real estate market." in Journal of Property Investment & Finance, Vol.23(1), p. 90-108.

SCHULTE, KARL-WERNER/ SCHÄFERS, WOLFGANG (2005). Immobilienökonomie als wissenschaftliche Disziplin. Immobilienökonomie - Band 1 - Betriebswirtschaftliche Grundlagen, 3rd Edition, Munich. SCHULTE, KARL-WERNER. Munich: 49-67.

SCHWARTZ, EDUARDO S./ TOROUS, WALTER N. (2007): "Commercial Office Space: Testing the Implications of Real Options Models with Competitive Interactions." in Real Estate Economics, Vol.35(1), p. 1-20.

SEILER, MICHAEL J./ WEBB, JAMES R./ MYER, F. C. NEIL (2001): "Can Private Real Estate Portfolios Be Rebalanced/Diversified Using Equity REIT Shares?" in Journal of Real Estate Portfolio Management, Vol.7(1), p. 25.

SHELOR, ROGER M./ ANDERSON, DWIGHT C. (1998): "The Financial Performance of REITs Following Initial Public Offerings." in Journal of Real Estate Research, Vol.16(3), p. 375.

SIMON (2008): "Form 10K for the fiscal year ended December 31, 2007 - Annual Report.

SIMONS, ROBERT A. (1993): "Public Real Estate Management -- Adapting Corporate Practice to the Public Sector: The Experience in Cleveland, Ohio." in Journal of Real Estate Research, Vol.8(4), p. 639.

SING, TIEN F./ LING, SZE C. (2003): "The Role of Singapore REITs in a Downside Risk Asset Allocation Framework." in Journal of Real Estate Portfolio Management, Vol.9(3), p. 219-235.

SIVITANIDES, PETROS S./ TORTO, RAYMOND G./ WHEATON, WILLIAM C. (2003): "Real Estate Market Fundamentals and Asset Pricing." in Journal of Portfolio Management, p. 45-53.

SIVITANIDES, PETROS S./ TORTO, RAYMOND G./ WHEATON, WILLIAM C. (2004): "Real Estate Market Fundamentals and Asset Pricing." in Journal of Portfolio Management, p. 45-53.

SKT (2007): "About the Company." retrieved September 18, 2007, from http://www.tangeroutlet.com/.

SLADE, BARRETT A. (2000): "Office Rent Determinants During Market Decline and Recovery." in Journal of Real Estate Research, Vol.20(3), p. 357-80.

SMITH, ALLEN/ HESS, ROBERT/ LIANG, YOUGOU (2005): "Point of View - Clustering the U.S. Real Estate Markets." in Journal of Real Estate Portfolio Management, Vol.11(2), p. 197-209.

SNL-DATABASE (2007): "Multiple Queries via the SNL interactive database via the SNLi excel add-in.

SNL (2007a): "Sector-Focused Data and News, Data and Essential Business Intelligence." retrieved October, 12 2007, from http://www.snl.com/snl_corp_broc.pdf.

SNL (2007b): "Multiple Queries via the SNL interactive database via the SNLi excel add-in.

SPG (2008): "About Simon Properties." retrieved March 22, 2008, from http://www.simon.com/.

SPIEGEL, MARK M. (2002): "The Disposition of Failed Japanese Bank Assets: Lessons from the U.S. Savings and Loan Crisis." in Economic Review Vol.2002, p. 1-15.

STANLEY, THOMAS O./ LAJAUNIE, JOHN P./ ROGER, CRAIG (2001): "The Bank Merger Environment & its Effect on Commercial & Industrial Real Estate Markets." in Real Estate Issues, Vol.26(4), p. 19.

STAPLETON, RICHARD C. (1999): "Some recent developments in capital market theory: A survey." in Spanish Economic Review, Vol.1(1), p. 1.

STEPHEN, LEE/ SIMON, STEVENSON (2005): "Testing the statistical significance of sector and regional diversification." in Journal of Property Investment & Finance, Vol.23(5), p. 394-411.

STEPHEN, LEE/ SIMON, STEVENSON (2006): "Real estate in the mixed-asset portfolio: the question of consistency." in Journal of Property Investment & Finance, Vol.24(2), p. 123-135.

STEVENSON, SIMON/ MCGARTH, OLIVER (2003): "A comparison of alternative rental forecasting models: empirical tests on the London office market." in Journal of Property Research, Vol.20(3), p. 235-260.

STEVENSON, SIMON (2007): "Exploring the Intra-Metropolitan Dynamics of the London Office Market." in Journal of Real Estate Portfolio Management, Vol.13(2), p. 93-98.

STR (2007a): "Glossary." retrieved March 22. 2008, from http://www.smithtravelresearch.com/smithtravelresearch/.

STR (2007b): "STR Data." retrieved December, 26 2007, from https://www.smithtravelresearch.com/SmithTravelResearch/data/login.aspx.

STRIBLING, DEES (2007): "Accounting for Real Estate around the World." NAREIT Real Estate Portfolio. Special Issue.

SU-JANE, CHEN et al. (1998): "Macroeconomic Variables, Firm-Specific Variables and Returns to REITs." in Journal of Real Estate Research, Vol.16(3), p. 269.

TANGER (2008): "Form 10K for the fiscal year ended December 31, 2007 - Annual Report.

TESSIER, ELEANOR/ MUELLER, GLENN R. (1999): "Trade area demand analysis for private pay assisted living facilities." in Journal of Real Estate Portfolio Management, Vol.5(3), p. 275.

TEXAS-REC (2007): "Real Estate Market Overview 2007 Austin - Texas University Real Estate Center." retrieved December, 25 2007, from http://recenter.tamu.edu/mreports/AustinRRock.pdf.

THOMSON (2007): "Thomson Datastream." retrieved October, 12 2007, from http://www.datastream.com/.

TULUCA, SORIN A./ MYER, F. C. NEIL (2000): "Dynamics of Private and Public Real Estate Markets." in Journal of Real Estate Finance & Economics, Vol.21(3), p. 279.

TURRA, MELISSA/ NELSON, MELISSA (2007): "How Developers and Hotel Operators Can Control Shared Facilities and Fairly Allocate Shared Facilities Expenses." in Real Estate Finance (Aspen Publishers Inc.), Vol.23(6), p. 12-14.

ULI (2004): "Multifamily Trends - Fall 2004 - Inside ULI." retrieved December, 12 2007, from http//www.uli.org/AM/Template.cfm?Section=Home&CONTENTID=97979&TEMPLATE=/CM/ContentDisplay.cfm.

USDOHUD, U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (2007): "U.S. Housing Market Conditions - Regional Activity Southeast/ Caribbean." retrieved December, 28 2007, from http://www.huduser.org/periodicals/ushmc/winter2001/southest.html.

WAGGLE, DOUG/ AGRRAWAL, PANKAJ (2006): "The Stock-REIT Relationship and Optimal Asset Allocations." in Journal of Real Estate Portfolio Management, Vol.12(3), p. 209-221.

WANG, KO/ ERICKSON, JOHN/ CHAN, SU HAN (1995): "Does the REIT Stock Market Resemble the General Stock Market?" in Journal of Real Estate Research, Vol.10(4), p. 445.

WANG, PEIJE (2003): "A Frequency Domain Analysis of Common Cycles in Property and Related Sectors." in Journal of Real Estate Research, Vol.25(3), p. 325-346.

WEILER, STEPHAN et al. (2003): "Understanding the Retail Business Potential of Inner Cities." in Journal of Economic Issues, Vol.37(4), p. 1075-1105.

WERNECKE, MARTIN/ ROTTKE, NICO/ HOLZMANN, CHRISTOPH (2004): "Incorporating the Real Estate Cycle into Management Decisions--Evidence from Germany." in Journal of Real Estate Portfolio Management, Vol.10(3), p. 171-186.

WHEATON, WILLIAM C./ ROSSOF, L. (1997): "The Cyclic Behaviour of the US Lodging Industry." CB Commercial/ Thorto Wheation Research, January 1997.

WHEATON, WILLIAM C./ TORTO, RAYMOND G./ EVANS, PETER (1997): "The Cyclic Behavior of the Greater London Office Market." in Journal of Real Estate Finance and Economics, Vol.15(1), p. 77-92.

WHEATON, WILLIAM C./ ROSSOFF, LAWRENCE (1998): "The cyclic behavior of the U.S. lodging industry." in Real Estate Economics, Vol.26(1), p. 67-82.

WHEATON, WILLIAM C. (1999): "Real Estate "Cycles": Some Fundamentals." in Real Estate Economics, Vol.27(2), p. 209-230.

WHEATON, WILLIAM C./ TORTON, RAYMOND G. (1999): "Real Estate Cycles: Measuring Differences in Retail Subtypes." in Real Estate Issues, Vol.24(2), p. 1.

WHEATON, WILLIAM C. (2005): "Resort Real Estate: Does Supply Prevent Appreciation?" in Journal of Real Estate Research, Vol.27(1), p. 1-16.

WHEATON, WILLIAM C./ NECHAYEV, GLEB (2005): "Does Location Matter? Do Property Fundamentals Vary within Markets, and Is This Reflected in Pricing?" in Journal of Portfolio Management, p. 100-108.

WHEATON, WILLIAM C./ SIMONTON, WILLIAM E. (2007): "The Secular and Cyclic Behavior of "True" Construction Costs." in Journal of Real Estate Research, Vol.29(1), p. 1-25.

WURTZEBACH, CHARLES H./ MUELLER, GLENN R./ MACHI, DONNA (1991): "The Impact of Inflation and Vacancy of Real Estate Returns." in Journal of Real Estate Research, Vol.6(2), p. 153.

WXH (2008): "About the Company." retrieved March 22, 2008, from http://www.winstonhotels.com/.

YAT-HUNG, CHIANG/ BO-SIN, TANG/ WING-YU, LEUNG (2001): "Market structure of the construction industry in Hong Kong." in Construction Management & Economics, Vol.19(7), p. 675-687.

YOON, DOKKO et al. (1999): "Real Estate Income and Value Cycles: A Model of Market Dynamics." in Journal of Real Estate Research, Vol.18(1), p. 69.

YOUNG, MICHAEL S. (2000): "REIT Property-Type Sector Integration." in Journal of Real Estate Research, Vol.19(1/2), p. 3.

YOUNG, MICHAEL S./ LEE, STEPHEN L./ DEVANEY, STEVEN P. (2006): "Nonâ€ Normal Real Estate Return Distributions by Property Type in the UK." in Journal of Property Research, Vol.23(2), p. 109-133.

YUNGMANN, GEORGE/ TAUBE, DAVID (2001): "FFO-Earning or Cash Flow?" NAREIT Real Estate Portfolio. May/ June 2001.

ZEW/ EBS, OESTRICH-WINKEL (2005): "Real Estate Investment Trusts (REITs): Internationale Erfahrungen und Best Practice für Deutschland, Teil des Abschlussberichts zum Forschungsprojekt 6/04 “Neue Assetklassen im internationalen Vergleich – Private Equity und REITs” für das Bundesministerium der Finanzen, Berlin, 5.23.2005, Mannheim.

BISHER IN DIESER REIHE ERSCHIENEN:

Band 1 Stephan Bone-Winkel
Das strategische Management von offenen Immobilienfonds
unter besonderer Berücksichtigung der Projektentwicklung von Gewerbeimmobilien
ISBN 978-3-932687-15-0

Band 2 Matthias Thomas
Die Entwicklung eines Performanceindexes für den deutschen Immobilienmarkt
ISBN 978-3-932687-23-5

Band 3 Wolfgang Schäfers
Strategisches Management von Unternehmensimmobilien
Bausteine einer theoretischen Konzeption und Ergebnisse einer empirischen Untersuchung
ISBN 978-3-932687-24-2

Band 4 Daniela Kirsch
Public Private Partnership
Eine empirische Untersuchung der kooperativen Handlungsstrategien in Projekten der Flächenerschließung und Immobilienentwicklung
ISBN 978-3-932687-27-3

Band 5 Sven-Eric Ropeter
Investitionsanalyse für Gewerbeimmobilien
ISBN 978-3-932687-30-3

Band 6 Gerrit Leopoldsberger
Kontinuierliche Wertermittlung von Immobilien
ISBN 978-3-932687-28-0

Band 7 Kerstin Hiska Brade
Strategischer Marketing-Planungsprozeß für Büroimmobilien
ISBN 978-3-932687-34-1

Band 8 Björn Isenhöfer
Strategisches Management von Projektentwicklungsunternehmen
ISBN 978-3-932687-35-8

Band 9 Christoph Buse
Strategisches Management von industrieverbundenen Wohnungsunternehmen
ISBN 978-3-932687-39-6

Band 10 Nicole Vaaßen
Gewerbliches Immobilienleasing
Eine quantitative und qualitative Analyse aus Sicht des Leasingnehmers
ISBN 978-3-932687-40-2

Band 11 Arno Väth
Die Grundstücks-Investmentaktiengesellschaft als Pendant zum REIT
Entwicklung einer Konzeption auf der Basis der KAGG-Novelle ‘98
ISBN 978-3-932687-41-9

Band 12 Petra Straßheimer
Internationales Corporate Real Estate Management
Implikationen der Internationalisierung von Unternehmen auf das betriebliche Immobilienmanagement
ISBN 978-3-932687-51-8

Band 13 Markus Hens
Marktwertorientiertes Management von Unternehmensimmobilien
ISBN 978-3-932687-52-5

Band 14 Barbara Pierschke
Die organisatorische Gestaltung des betrieblichen Immobilienmanagements
ISBN 978-3-932687-71-6

Band 15 Victoria Walbröhl
Die Immobilienanlageentscheidung im Rahmen des Kapitalanlagemanagements institutioneller Anleger – eine Untersuchung am Beispiel deutscher Lebensversicherungsunternehmen und Pensionskassen
ISBN 978-3-932687-78-5

Band 16 Ramon Sotelo
Ökonomische Grundlagen der Wohnungspolitik
ISBN 978-3-932687-80-8

Band 17 Marcel Crommen
Finanzierung von Unternehmensimmobilien
Eine Shareholder Value-orientierte Analyse
ISBN 978-3-932687-79-2

Band 18 Marcus Cieleback
Bausparen und Optionstheorie
ISBN 978-3-932687-86-0

Band 19 Antje Schulz-Eickhorst
Die Bauherren-Architekten-Beziehung
– eine institutionenökonomische Problemanalyse mit Lösungsansätzen
ISBN 978-3-932687-87-7

Band 20 Jeannette Werner
Die Besteuerung von Gewerbeimmobilien in Europa
Effektive Steuerbelastung und Steuerbeständigkeit in einem Fünf-Länder-Vergleich.
ISBN 978-3-932687-88-4

Band 21 Irene Hagemeier
Der Einsatz staatlicher Instrumente in der Wohnungs- und Bodenpolitik des 20. Jahrhunderts
Deutschland, Spanien, Schweden und die USA im Vergleich
ISBN 978-3-932687-95-2

Band 22 Ludwig Vogel
Projektentwicklung von Factory Outlet Centern
– eine akzeptanztheoretische Untersuchung
ISBN 978-3-932687-97-6

Band 23 Felix Iblher
Internetbasierte Immobilienfinanzierung
Auswirkungen des Electronic Business auf die Finanzierung privater Wohnimmobilien
ISBN 978-3-932687-96-9

Band 24 Jan Gerhard
Immobilienportfoliomanagement mit Immobilienindex-Derivaten
– eine kritische Analyse und Bewertung der Einsatzmöglichkeiten immobilienindexbasierter Finanzinstrumente auf dem deutschen Markt.
ISBN 978-3-932687-98-3

Band 25 Pamela Busz
Seniorenimmobilien als Investitionsobjekte
– Entwicklung und empirische Analyse eines Beurteilungsmodells
ISBN 978-3-89984-106-0

Band 26 Carsten Fischer
Projektentwicklung: Leistungsbild und Honorarstruktur
ISBN 3-89984-114-5

Band 27 Christian Ecke
Strategisches Immobilienmanagement der öffentlichen Hand
ISBN 978-3-89984-119-0

Band 28 Ira Blumenthal
Anforderungen an ein Marketingkonzept für Facilities-Management-Dienstleistungsunternehmen
– Ein Vergleich zwischen Theorie und Empirie
ISBN 978-3-89984-120-6

Band 29 Nico Rottke
Investitionen mit Real Estate Private Equity
– Herleitung eines anreizkompatiblen Beteiligungsmodells unter Berücksichtigung der Transaktionskosten- und Agency-Theorie
ISBN 978-3-89984-126-8

Band 30 Christoph Pitschke
Die Finanzierung gewerblicher Immobilien-Projektentwicklungen unter Basel II
ISBN 978-3-89984-125-1

Band 31 Martin Wernecke
Büroimmobilienzyklen
ISBN 978-3-89984-131-2

Band 32 Frank J. Matzen
Unternehmensbewertung von Wohnungsbauunternehmen
ISBN 978-3-89984-138-1

Band 33 Christian Focke
Gewerbeimmobilien-Investments in Polen
ISBN 978-3-89984-140-4

Band 34 Marc Breidenbach
Real Estate Securitisation
ISBN 978-3-89984-139-8

Band 35 Sonja Gier
Bereitstellung und Desinvestiton von Unternehmensimmobilien
ISBN 978-3-89984-153-4

Band 36 Andrea Pelzeter
Lebenszykluskosten von Immobilien
– Einfluss von Lage, Gestaltung und Umwelt
ISBN 978-3-89984-156-5

Band 37 Kaja Beidatsch
Geographic Selection
– Auswahl von Zielmärkten im Portfoliomanagement
ISBN 978-3-89984-157-2

Band 38 Verena Sturm
Erfolgsfaktoren der Revitalisierung von Shopping-Centern
– ein Turnaround-Management-Ansatz
ISBN 978-3-89984-159-6

Band 39 Matthias Zimmermann
Projektentwicklung im Immobilienbestand
ISBN 978-3-89984-160-2

Band 40 Christoph Holzmann
Entwicklung eines Real Estate Confidence Indicator zur kurzfristigen Konjunkturprognose auf Immobilienmärkten
ISBN 978-3-89984-158-9

Band 41 Christian Kolb
Corporate Governance bei deutschen Immobilienkapitalgesellschaften
ISBN 978-3-89984-164-0

Band 42 Christian Flüshöh/Daria Stottrop
Büroflächenbestand – Grundlagen, Daten und Methoden
ISBN 978-3-89984-166-4

Band 43 Philip Boll
Investitionen in Public Private Partnership-Projekte im öffentlichen Hochbau unter besonderer Berücksichtigung der Risikoverteilung
Eine theoretische und empirische Untersuchung der Anforderung privater Investoren
ISBN 978-3-89984-177-0

Band 44 Philip Hofmann
Immobilien-Projektentwicklung als Dienstleitung für institutionelle Auftraggeber
ISBN 978-3-89984-178-1

Band 45 Kilian Mahler
Logistikimmobilien: Optimierung des Investment- und Logistikerfolges
ISBN 978-3-89984-187-9

Band 46 Nicolai Gerstner
Entscheidungsprozesse in Unternehmen bei der Anmietung von Büroimmobilien
ISBN 978-3-89984-194-7

Band 47 Philipp Naubereit
Harmonisierung internationaler Immobilienbewertungsansätze
ISBN 978-3-89984-188-6

Band 48 Markus Staiber
Immobilienbewertung in der Kreditwirtschaft
Vorschläge zur Prozessoptimierung
ISBN 978-3-89984-201-2

Band 49 Tobias Pfeffer
Performance of REITs
A Sector- and Company-based Analysis of Links and Time Lags between Real Estate Market Cycles, Earnings, and Pricing of REITs
ISBN 978-3-89984-189-3